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Production and Consumption of Zinc in 1907

Statistics of Zinc Ore Production in the United States, Canada and Mexico; Spelter Production; and Consumption According to Uses

BY WALTER RENTON INGALLS

The production of spelter in the United States in 1907, together with the corresponding figures for 1906, is given in Table I, which is based on reports from all of the producers. The nature of the zinc-smelting industry is such that the statistics of production can be collected and summarized with great accuracy.

I. PRODUCTION OF SPELTER.

(In tons of 2000 lb.)

State.	1906.	1907.
Colorado	6,260	5,200
Illinois	48,238	56,103
Kansas	129,741	133,561
Missouri	11,088	11,594
Oklahoma		5,094
East and South	30,167	38,060
Total	225,494	249,612

Table I gives the production only of virgin spelter. There is in addition a small annual production of spelter from the dross of galvanizing works and other waste products. It will be observed that Oklahoma appears for the first time as a producer of spelter. The production in that State will no doubt increase greatly in 1908, inasmuch as two works which were not completed until December, 1907, will figure prominently in the statistics of the current year.

Smelting Capacity

In 1907 there was a large increase in the zinc-smelting capacity of the United States. The National Zinc Company, Bartlesville Zinc Company, and Lanyon-Starr Smelting Company each completed new works at Bartlesville, Oklahoma. The American Zinc, Lead and Smelting Company completed a new plant at Deering, Kansas. The United Zinc and Chemical Company completed a small plant at Springfield, Ill. Several of the works above mentioned did not begin operation until December, wherefore they had no material effect upon the production of 1907. The works of the Mineral Point Zinc Company, at Depue, Ill., under construction in 1906, were in operation with three furnaces during the first half of 1907. The works of Hegeler Brothers at Danville, Ill., were completed in 1907, but did not go into operation.

Among the older works there were also many increases in capacity in 1907. At Palmerton, Penn., the New Jersey Zinc Company added one furnace with 200 retorts. The Granby Mining and Smelting Company added one new furnace with 620 retorts to its works at Neodesha, Kan. The Grasselli Chemical Company added a new furnace with 576 retorts to its works at Clarksburg, W. Va. The Cockerill Zinc Company added a new furnace with 740 retorts to its works at Altoona, Kan.

At the end of 1907, the list of American zinc smelters, together with their number of furnaces and number of retorts, was as shown in Table II, which is substantially correct, although there may be slight errors in the case of a few companies; however, these will not materially affect the total.

It will be seen from Table II that at present there is a great surplus in smelting capacity. The total number of retorts is 87,640, and of muffles is 1920. These give capacity for smelting annually about 625,000 tons of roasted ore (or calamine), which would correspond to about 750,000 tons on the basis of blende. The ore purchased by the smelters in 1907, excluding the Pennsylvania and Virginia works of the New Jersey Zinc Company, amounted to 644,170 tons, but of this about 93,000 tons was used by the Western oxide works. The combined production of the Joplin and Wisconsin districts, together with that of Arkansas and Oklahoma, was 357,475 tons, leaving only 193,695 tons of ore for making spelter as coming from other districts, chiefly those west of the Rocky mountains and in Mexico. The Joplin district does not appear to be able to make any large increase in production; the output of the Wisconsin district is steadily increasing, but it does not yet play a very large part in the domestic zinc industry.

WORKS OF NATIONAL ZINC COMPANY, BARTLESVILLE, OKLAHOMA

At the end of 1907 there was a lull in smelter construction, due partly to the industrial setback and partly to the realization that the smelting capacity is now sufficient for the needs in the near future. At present, so far as I am aware, there is no large plant under construction or in definite contemplation, and the existing smelters are making no further additions to their plants.

General Conditions in 1907

During the early part of 1907, the margin on ores was quite satisfactory to the smelters, so much so that the

Collinsville Zinc Company contemplated putting its old plant at Collinsville, Ill., into operation again. The remarkable setback in the zinc industry in the latter half of the year reduced the margin to a narrow figure, and the tendency was then strongly to put furnaces out of commission rather than to fire up old ones. Nevertheless, the old coal smelters at Rich Hill and Nevada, Mo., and two of the old works at Pittsburg, Kan., continued in operation on a small scale. The new life of these old works is based (1) on the increased cost of gas to many of the gas smelters, reducing materially the difference in cost between smelting with the two fuels; (2) on careful attention to the metallurgical work and the commercial side of the business; and (3) on the reduction of general expense to a very small figure by the direct attention of the proprietors.

II. ZINC SMELTING CAPACITY OF THE UNITED STATES.

Name.	Location.	Furnaces.	Retorts.
Grasselli Chemical Co	Clarksburg, W. Va.	10	5760
Matthiessen & Hegeler Zinc Co	Lasalle, Ill.	5	4320
Illinois Zinc Co	Peru, Ill.	7	4800
Sandoval Zinc Co	Sandoval, Ill.	4	896
Mineral Point Zinc Co	Depue, Ill.	6	4800
Hegeler Bros	Danville, Ill.	2	1700
Edgar Zinc Co	St. Louis, Mo.	9	2016
" " "	Cherryvale, Kan.	24	4800
Lanyon Zinc Co	Iola, Kan.	5	3000
" " "	Iola, Kan.	5	3000
" " "	Iola, Kan.	5	3000
United Zinc and Chemical Co.	Iola, Kan.	4	2304
" " " " "	Iola, Kan.	2	(a) 480
" " " " "	Springfield, Ill.	2	640
Cockerill Zinc Co	Iola, Kan.	4	2520
" " "	Iola, Kan.	3	1856
" " "	Altoona, Kan.	6	3840
" " "	Pittsburg, Kan.	6	1344
" " "	Nevada, Mo.	3	672
" " "	Rich Hill, Mo.	3	672
Granby Mining and Smelting Co	Neodesha, Kan.	6	3840
United States Zinc Co.	Pueblo, Colo.	6	(a) 1440
American Zinc, Lead and Smelting Co.	Caney, Kan.	6	3720
" " " " " "	Deering, Kan.	6	3840
New Jersey Zinc Co	Bethlehem, Penn.	3	672
" " " "	Palmerton, Penn.	12	2400
Bertha Mineral Co	Pulaski, Va.	10	1400
Prime Western Spelter Co.	Iola, Kan.	9	5344
" " " "	Iola, Kan.	5	3220
Bartlesville Zinc Co	Bartlesville, Okla.	6	3456
Pittsburg Zinc Co.	Pittsburg, Kan.	4	896
Lanyon-Starr Smelting Co	Bartlesville, Okla.	5	2880
National Zinc Co	Bartlesville, Okla.	4	2432
Chanute Zinc Co.	Chanute, Kan.	8	1600
Totals		205	89,560

(a) Rhenish furnaces, with muffles.

With respect to the cost of smelting in general, it is now well known that the cost of natural gas to many of the smelters in Kansas, is so much that a coal smelter in Illinois is at least on equal terms, and perhaps on superior, if sulphuric acid be recovered as a by-product. There are still, however, some smelters, especially those at Caney, Deering, and Bartlesville, which are able to obtain natural gas at low figures, and smelt a good class of ore at as low as $8 per ton, which is not very much above the cost in the halcyon days at Iola. A smeltery in the natural-gas field has the great attraction that its cost per ton of capacity is much less than that of a modern smeltery to use coal as fuel, which is an important consideration even when the gas supply is comparatively costly. However, the general development of the industry in the United States is taking place precisely on the line that I predicted several years ago, namely, there is the installation of new plants at new points in the gas fields where the builders are willing to risk short life with the expectation of reaping quick and large profits; while on the other hand there is an increasing tendency to build more costly and more substantial plants in the coalfields of Illinois, where a permanent business may be expected.

As to the situation at Iola, it may be summed up in the statement that the smelters still have an adequate supply of gas. It has been predicted during each of the last four years that the next year would be the end, but the smelters still have sufficient gas to run the 42 blocks of furnaces of the district. Nevertheless, the opinions that were expressed four years ago were not incorrect. It is the fact that the old Iola pool, which was the original source of supply, has been exhausted, but new pools have been discovered to the north and west, from which these smelters have been obtaining their gas. In 1907 some of the smelters united in putting down a deep, experimental well, in East Iola, to prospect for gas at a lower horizon. By the middle of November this had attained a depth of 2500 ft. and there was not much hope that the prospecting would result successfully.

Consumption of Natural Gas

With the increased cost of gas, more attention is paid to economy in its use. In several cases the consumption has been metered for test. The figures for an ordinary block range from 630,000 to 750,000 cu.ft. per day. In round numbers this is 40,000 to 50,000 cu.ft. per ton of raw sulphide ore, or 48,000 to 60,000 cu.ft. per ton of roasted ore or calamine. I do not know of any measurements in the case of the roasting furnaces commonly used. In the case of a well designed roasting furnace the consumption was about 4500 cu.ft. per ton of raw ore, which is a reasonable figure, but the Zellweger furnaces are very extravagant of gas. Probably they consume 30,000 to 40,000 cu.ft. per ton of raw ore.

This is an important matter now that gas is becoming more and more costly. According to the report of the U. S. Geological Survey, the average value of the gas consumed by zinc smelters in Kansas, in 1906, was 1.8c. per 1000 cu.ft., the cost ranging from 1 to 3c. per 1000 cu.ft. These figures appear to be nearly correct. Certainly they are none too high.

Consumption of Spelter

The production of virgin spelter in 1907 was 249,612 tons. The stock on hand at the beginning of the year was 4550 tons. The imports were 1778 tons. The total supply was consequently 255,940 tons. The exports amounted to 563 tons, and the stock on hand at the end of the year was 32,883 tons. The computed consumption, consequently, was 222,494 tons. In addition to the consumption of virgin spelter there is a considerable consumption of spelter produced by resmelting of galvanizers' dross and other waste products. Estimating this supply at 3000 tons, the total computed consumption in the United States in 1907 was 225,494 tons.

III. CONSUMPTION OF SPELTER IN THE UNITED STATES. (a)

(In tons of 2000 lb.)

	1906.	1907.
Stock, Jan. 1	4,000	4,550
Production	225,494	249,612
Imports	2,203	1,778
Total supply	231,697	255,940
Exports	4,670	563
Stock, Dec. 31	4,550	32,883
Consumption	222,477	222,494

(a) Computed on the basis of virgin spelter only.

IV. CONSUMPTION OF SPELTER.

(In tons of 2000 lb.)

Purpose.	1906.	1907.
Galvanizing	124,000	149,000
Brass-making	57,000	40,000
Sheet zinc	36,000	30,000
Lead desilverizing	2,500	2,600
Other purposes	6,000	4,000
Total	225,500	225,600

As in previous years I have sought to check the computed consumption and separate it according to uses by direct reports from the consumers. Most of the large consumers (manufacturers) promptly and willingly report their figures, but there are many small users of spelter from whom it is next to impossible to secure reports. Fortunately, these are chiefly users of spelter for brass-making and for what is classed as "other purposes." All of the manufacturers of sheet zinc made reports for 1907, as did also practically all of the galvanizers. The consumption of spelter for the desilver-

ization of lead is readily computed from the amount of lead desilverized. Consequently there is a sound basis for estimating the consumption of spelter for brass-making and for other purposes by difference. A very large part of the consumption for 1907 was actually accounted for by direct reports from the manufacturing consumers. The classification of the consumption is given in Table IV.

Table IV is highly interesting in its showing. The consumption for galvanizing increased largely, as, of course, was known in a general way to the smelters during the year, their orders from the galvanizers being unusually large up to the third quarter. The consumption for the manufacture of sheet zinc fell off largely. In this business the industrial setback was clearly manifest as early as June, and by July the manufacturers were reporting a serious decrease in orders. The huge falling off in the consumption of spelter for brass-making indicates that adverse conditions must have developed equally early in the brass industry. Indeed, we know from the history of the copper industry that such must have been so, the depression in business dating back at least to April, 1907.

I estimated that in 1906 the domestic consumption of copper for brass-making was about 114,000 tons. On the same basis the consumption in 1907 was only 80,000 tons.

The apparent falling off in the consumption of zinc for "other purposes" in 1906 is explained by a more complete itemization of the consumption in 1906; in other words, there was probably more spelter used for brass-making in 1905 than the table shows. The great increase in the above proportion used for galvanizing during the last three years is a particularly noteworthy feature of the industry.

V. PERCENTAGE OF CONSUMPTION.

Purpose.	1905.	1906.	1907.
Galvanizing	50	55	66
Brass-making	26	25¼	17¾
Sheet zinc	17	16	13½
Lead desilverizing	1½	1	1½
Other purposes	5¾	2¾	1¾
Total	100	100	100

SITUATION OF THE PRINCIPAL ZINC PRODUCING DISTRICTS OF THE UNITED STATES

Production of Zinc Oxide

In 1907 four companies were engaged in the manufacture of zinc oxide and zinc-lead pigment direct from ores. Their production, together with the corresponding figures for 1906, is summarized in Table VI. It is to be remarked that this table no longer represents the production of zinc oxide proper, inasmuch as certain of the companies make both the oxide and zinc-lead pigment, the latter being produced by the treatment of mixed ores in substantially the same way that zinc ore is treated alone. Inasmuch as the two products are consumed for the same purpose, namely, as pigment, they are properly lumped together in the statistics. It is impossible to report them separately without disclosing the business of individual producers.

VI. PRODUCTION OF ZINC OXIDE.

Year.	Tons.	Value.
1906	77,800	$6,257,361
1907	85,390	7,731,100

Production of Zinc Ore

The production of zinc ore in the United States, Canada and Mexico in 1906 and 1907 is given in Table VII. The figures in this table are based on reports received from the various smelters, showing their purchases of ore, classified according to States, Territories or country of origin. Such reports were received from all of the smelters with two exceptions, whose statistics were compiled on the basis of reports received as to the shipments of ore to them. For this reason the total may be a little too low, especially in the case of certain of the minor States, including Arkansas.

Although the total for the United States showed a slight falling off as compared with 1906, it is to be noted that this was due to the decrease in the State of New Jersey, the figures for which represent the crude ore produced by the Franklin mine of the New Jersey Zinc Company. The large decrease in the production of New Mexico was due to the smaller output of the mines at Magdalena, which were worked on a comparatively small scale pending the installation of works for the separation of mixed products. With these exceptions, most of the important zinc-producing States showed increases in 1907.

It is worthy of remark that the reports of the smelters as to ore received from the Joplin and Wisconsin districts show in each case slightly larger amounts than reported by Jesse A. Zook and J. E. Kennedy, the local statisticians, who are also correspondents of the ENGINEERING AND MINING JOURNAL. Deducting the shipments from Oklahoma, Mr. Zook's figure for the Joplin district is 283,433 tons, while the smelter figure is 295,626 tons. Mr. Kennedy's report for Wisconsin was 49,778 tons, while the smelter figure is 53,011 tons. These differences may be accounted for by ore in transit, and also probably by various small omissions, but both for the Joplin district and the Wisconsin district the results are so close that great credit is reflected on the local statisticians and is strong testimony as to the reliability of their work.

All of the Western smelters in 1907 purchased ore from the Joplin district to more or less extent, with two exceptions, both of the latter using Colorado ore almost exclusively. The output of the Wisconsin district was purchased by six smelters. Mexican ore was imported by 15 smelters. Nearly all of the Western smelters used ore from Mexico and from the States and Territories west of the Rocky mountains to more or less extent, the important exceptions being the companies at Lasalle and Peru, Ill., whose supply was derived chiefly from the Joplin and Wisconsin districts. The major portion of the output of the Joplin district was purchased by six concerns, each of these obtaining therefrom supplies of ore in excess of 23,000 tons.

VII. PRODUCTION OF ZINC ORE IN THE UNITED STATES.

(In tons of 2000 lb.)

State.	1906. Tons.	1907. Tons.
Arizona	(a)	285
Arkansas	4,200	4,088
Colorado	114,000	142,510
Idaho	2,150	11,847
Kentucky	975	1,005
Missouri-Kansas	280,260	297,126
Montana	4,900	1,218
Nevada	7,080	4,593
New Mexico	30,000	4,281
New Jersey	404,690	368,710
Oklahoma	3,240	3,250
Tennessee	(a)	1,071
Utah	10,700	9,043
Wisconsin	42,130	53,011
Others	850	885
Totals	905,175	902,923
British Columbia	600	1,157
Mexico	88,900	108,800
Grand totals	994,675	1,012,880

(a) Included in other States.

In spite of the steady decline in the values of spelter and ore during the second half of 1907, and the financial catastrophe in October, the production of ore in the Joplin district and in the Wisconsin field showed a considerable increase. What might have happened if it had not been for the set-back is manifested by the statistics for the first six months of 1907, which show shipments of 158,000 tons from Joplin and 25,000 tons from Wisconsin. On the other hand, many of the districts west of the Rocky mountains made smaller outputs than in 1906, indicating that the productive capacity of their mines has reached a maximum. The importation of ore from Mexico was checked when the price for spelter fell to 5c., St. Louis, in September, but nevertheless the total for the year was largely in excess of that of 1906. But little ore was brought in from British Columbia at any time, the supply in that province being blende. During 1907 all importations of zinc ore were made with payment of duty under protest, the decision of the Board of Appraisers having been appealed to the courts by the Government. A decision from the U. S. Circuit Court for southern Texas, upholding the previous decision of the Board of General Appraisers in favor of the importers was rendered in April, 1908. The experience of 1907 seems to show that these foreign ores are not serious competitors of the American, duty or no duty.

THE MARGIN ON JOPLIN ORE

During the early part of 1907 the margin on Joplin ore was strongly in favor of the smelters and they realized handsome profits, but in July, when the price for spelter began to fall off sharply, the margin diminished to less than the smelters should normally have in order to earn a fair return on their investment, and in subsequent months the margin fell to the point where there was no profit at all. The monthly figures are given in the following table, whereof the first column gives the value of 1020 lb. of spelter at St. Louis (85 per cent. of 1200 lb.), the second column the value of blende containing 60 per cent. zinc at Joplin, and the third column the difference, or margin.

VIII. MARGIN ON JOPLIN ORE.

Month.	Spelter.	Ore.	Margin.
January	$67.14	$46.90	$20.24
February	67.97	48.30	19.67
March	68.21	49.75	18.46
April	66.66	49.25	17.41
May	64.17	46.90	17.27
June	63.94	47.00	16.94
July	60.40	46.80	13.60
August	56.62	44.56	12.06
September	51.88	41.00	10.88
October	53.86	41.75	12.11
November	48.71	38.60	10.11
December	41.86	31.50	10.36

CONDITIONS IN THE JOPLIN DISTRICT

The decline in the value of ore was felt keenly both in the Joplin district and in Wisconsin, where the market price fell below the actual cost of production in so far as a large proportion of the output is concerned. The difficulties of the situation were enhanced by the simultaneous decline in the value of lead ore. An attempt to check the decline by restriction of production by agreement among the Joplin operators was made in September, but although this had a temporary effect, it was, of course, ineffectual in combating the general industrial depression that was impending. In November, when it became a question with many operators either to close down or to reduce the cost of production, a reduction in wages was made.

It is impossible to generalize the cost of production at Joplin, so many different factors entering into the consideration. The most important is, of course, the yield of the ore, after which are the factors of cost of mining and milling and the amount of royalty to be paid. Assuming that blende containing 60 per cent. zinc is worth $40 per ton, and lead ore, $42 per ton, and that one-sixth of a ton of lead ore is obtained with each ton of zinc ore, the gross value of the two concentrates is $47 per ton. If a royalty of 20 per cent. is to be paid, the net value to the operator is $37.60 per ton. If it be necessary to mine 33 tons of ore to obtain one ton of blende concentrate, i.e., to obtain a yield of about 3 per cent., and the cost of mining and milling be $1.10 per ton, the total cost of production is $36.30, leaving a profit of only $1.30 for the mining and milling of 33 tons of ore, or only 4c. per ton of ore hoisted from the mine.

A good deal of ore was produced in 1907 under precisely the above conditions. On the other hand there was more or less concentrate produced from ore of a better grade, even up to a yield of 5 per cent., or at a lower royalty, or perhaps even at a little lower cost for mining and milling, which could be produced profitably at less than $40 per ton for blende concentrate, and the revival in the Joplin district during 1908 indicates that it has been possible to readjust conditions so as to make a large production with zinc ore commanding less than $40 per ton.

PRODUCTION IN THE ROCKY MOUNTAINS

The cost of producing zinc ore in the districts to the west of the Rocky mountains is variable and uncertain. In general the cost of mining is much higher than at Joplin, but also the crude ore is much higher in grade, although the component minerals are not so easily separated. Leadville, which is the largest single source of supply among these districts, began the production of zinc ore as a by-product, but the zinc-lead ore originally mined, from which the blende was so obtained, has been largely exhausted and the recent production has been made chiefly from blende-pyrites from which a commercial grade of zinc ore cannot be cheaply produced. In 1907 a good deal of Leadville zinc ore was sold on the formula of T—8 less a returning charge of $15 per ton, basis Iola. However, other ores were bought at much lower terms, and indeed during the latter half of the year the only margin of profit to the smelters was on their purchases of Western ore. When the price of spelter fell to the neighborhood of 4c., St. Louis, a good many of the Leadville producers found that there was no more profit in the business and suspended operations.

The great drawback to a large produc-

tion of zinc ore in the Rocky mountains is the costliness of the processes required to bring the zinc concentrate up to good commercial grade. The first cost of a magnetic separating plant is high, and the operating cost also is high.

Fuller's Earth, Kaolin and Peat in Florida

By E. H. Sellards*

The first discovery of fuller's earth in the United States was made in Gadsden county, Florida, in 1893. The deposits have since been shown to occur in Leon and Liberty counties, adjoining Gadsden, and also to extend across the State line into Georgia. Elsewhere in Florida fuller's earth is known to occur in Alachua and Manatee counties.

Fuller's Earth

During 1907 fuller's earth was mined in two localities in Gadsden county and in Manatee county, in southern Florida. The earth is of a light buff to a light blue color. The overburden is of variable thickness, and mining is done chiefly with pick and shovel by the open-pit method; steam shovels for the removal of the overburden are, however, in use. Upon removal from the pit the fuller's earth is dried and ground; it is then passed through sieves of proper mesh, sacked for market and numbered according to degree of fineness.

The product is used principally in the United States, although a part of the 1907 product is reported as having been exported to foreign markets. The demand in general is good. The total amount of fuller's earth mined in Florida during 1907, as reported by the producers, was 24,148 short tons, valued at $235,443.

Kaolin

Florida produces an exceptionally plastic kaolin, or ball clay, which is used to mix with and improve the quality of less plastic kaolins. These plastic kaolins occur bedded, and as deposited contain considerable sand. This sand is removed by washing. The fine clay is allowed to settle and is then pressed to remove the excess of water. Afterward it may be either artificially or air-dried for shipment. Plastic kaolin was mined at three points, all situated in central Florida, during 1907. The total output for the year was 19,615 tons, valued at $102,978.

Peat

The peat deposits of Florida, although believed to be extensive, are as yet imperfectly developed. Two plants were in operation during all or part of 1907. The product from one of them was used locally as fuel. The peat here is shoveled from the pit and conveyed to the plant by electric power. After kneading, it is air-dried and broken up for fuel. Both the fuel and the gas-producing qualities of the peat are reported to be good. The second plant is operated with a dredge and the product utilized principally in fertilizers.

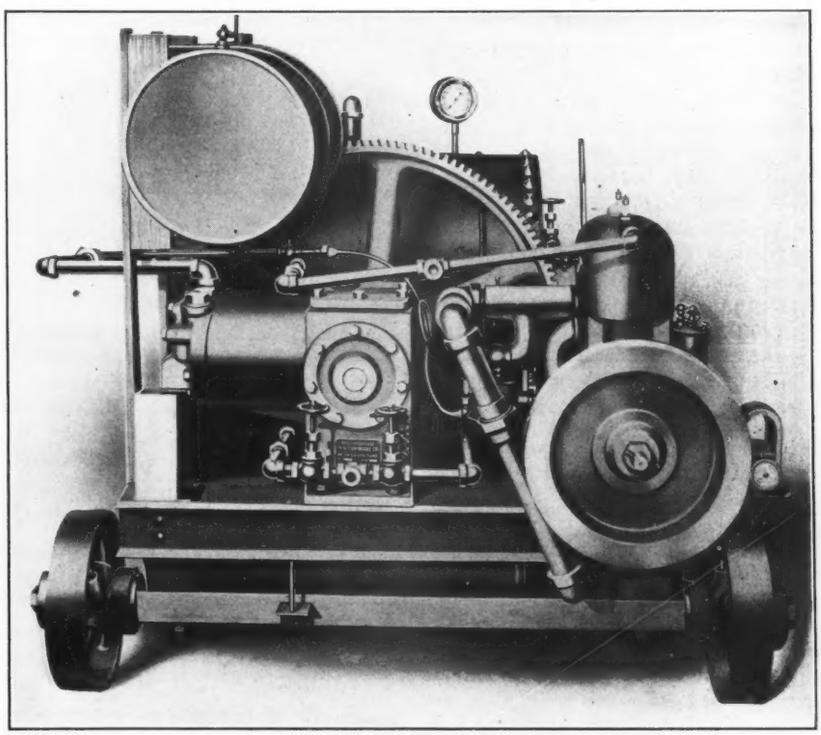
*State geologist, Tallahassee, Fla.

Gasolene Driven Portable Air Compressor Plant

The standard air compressor of the Westinghouse Traction Brake Company lends itself to arrangements required by a variety of special conditions. The accompanying illustration shows a portable plant designed for use in construction work at points where no power supply of any description is available. The compressor is driven by a gasolene engine, which takes the place of the electric motor ordinarily used. All the details are of standard manufacture. The plant was assembled by the Link Belt Engineering Company of Philadelphia, for its own use in construction work.

The outfit is mounted on a truck made of steel channels and partly covered with sheet iron. A D-2 water-jacketed "pump" is connected by gear and pinion to the engine shaft through a friction clutch. The engine is a Lackawanna two-cylinder 5-horse-power, marine-type gasolene engine. The gasolene is stored in the small tank supported above the air pump. The carbureter is placed on the truck between the engine and pump. A small magnetic dynamo resting on a sheet-iron platform, is so placed that it is driven by frictional contact with the rim of the engine flywheel; this little dynamo furnishes the sparking current. Both engine and pump are water-cooled from a single supply connection but the flow of water to each may be regulated separately by globe valves in each inlet branch. The air reservoir is 20½x36 in., and has an approximate capacity of 10,400 cu.in., or 6 cu.ft.

The ratio of driving gear and pinion is such that the pump operates at about 208 revolutions per minute. This plant has proved entirely satisfactory for the purpose designed, and shows the ease with which the equipment may be modified for special purposes.



PORTABLE GASOLENE AIR COMPRESSOR

Leadville, Colo., was once the largest source of lead ore in the United States, and is still of considerable importance. The ore deposits occur at the contact of a formation of carboniferous limestone with an overlying sheet of white porphyry, and in channels in the limestone itself. The ore-bearing area is extensive, but by far the most of the mineral has come out of a section less than two miles square. The country rock is much folded and faulted, and disturbed by intrusions (dikes and sheets) of gray porphyry of later age than the white porphyry. The porphyry-limestone contact dips east at a moderate angle, and is exposed at the surface by the upthrow of several great fault series, especially the Carbonate and Iron faults. These exposures have afforded easy access to the orebodies.

Inclined Room Haulage

In the first number of *Annales des Mines de Belgique*, for 1908, M. Fourmarier describes a method of lowering loaded mine cars out of inclined rooms, recently adopted at one of the Horloz collieries, the idea being to avoid the necessity of pushing the cars up-grade into the rooms, either by hand, or by locomotive power. The rooms in this mine average 80 m. deep, and are driven to the rise. The apparatus includes a sectional, portable track, a windlass and rope, and a truck upon which the mine cars can be placed.

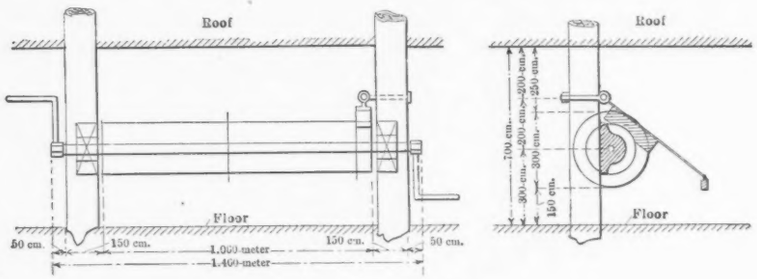


FIG. 1. THE WINDLASS

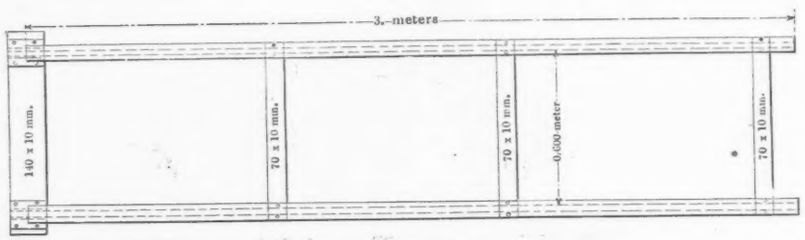


FIG. 2. THE TRACK

The track, 70 cm. gage, is made of rails weighing 7 kg. per meter, riveted to iron strips, 70 by 10 mm., spaced 1 m. apart. Each section is 3 m. long, and is terminated at one end by a plate 140 mm. wide, which serves to make connection with the next section. No loose bolts or pins are used. To the wide plate are riveted two clamps which grip the base and the web of the rails for a distance of 70 mm., offering the same length to grip the adjoining rails. A section weighs about 62 kg. and can therefore be handled with ease, and without any danger of losing small pieces.

The windlass is made of sufficient size to hold twice the length of rope needed when the room shall have reached its maximum depth. A rope of 10 mm. diameter is used. An iron axle, 40 mm. square, and 1.06 m. long, extends through a wooden cylinder of 20 cm. diameter, each end of which is terminated by a sheet-iron disk, while a similar disk divides the cylinder at its middle. The axle is supported by a pair of brackets fastened to two timber props. At one end of the windlass is a turned wooden pulley, upon which bears a wooden block attached to a lever in such a way as to act as a brake. The ends of the axle are squared to receive two cranks. The windlass can be used in a heading 0.70 m. high.

The truck was built of materials on hand and was, therefore, somewhat heavy. The wheels are of 25 cm. diameter, and the axles 50 by 50 mm. They are joined by two bars bent slightly downward so as to bring the platform as close as possible to the ground. The two bars are joined and covered by a sheet-iron plate. Blocks are provided to prevent too great movement both sideways and endways.

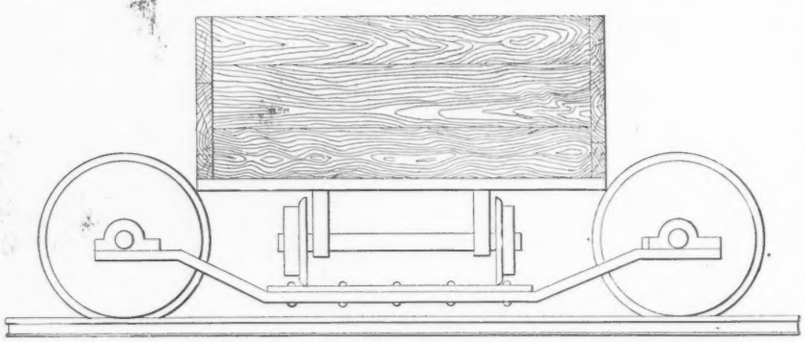


FIG. 3. THE TRUCK

By ordering specially made materials, the weight of the truck could be considerably reduced. In case of a room the output from which is not sufficient to keep a car handler constantly busy at the foot of the incline, five or six cars can be hoisted into the room in succession, loaded in turn, and lowered when the handler has returned from some other room.

The arrangement described above has been in use for several months, or long enough to judge accurately as to its advantages. These are: Better utilization of the car loaders' time, which permits a reduction in the number of such workmen employed; fewer delays on the part of the cutters and miners, and a smaller allowable size for the rooms than when the cars have to be pushed by hand. Among the disadvantages are the necessity for a larger amount of equipment, and for a special organization of the car handlers in case each one has to attend to more than a single room. On the whole, the method is thought to enlarge considerably the output from the rooms.

Causes of Coal-dust Explosions

The consensus of opinion on the subject of coal-dust explosions is summarized by F. Breynaert, in *Annales des Mines*, December, as follows:

Not all dust is explosive; its liability to explode depends upon its fineness and its percentage of pure carbon. The dust made by hand miners is not explosive, but that coming from screens, and that collected on the underground timbering are exceedingly dangerous. A dust explosion has been known to be extinguished on arriving at a level where the dust was highly silicious.

A very small quantity of dust is sufficient to propagate an explosion. The most favorable proportion of air is not known; experience seems to show that dust explosions begin most frequently in main haulage ways, where there is an abundant circulation, but this may be because those passages are also the most dusty.

Dust explosions are most commonly generated by an explosion of gas, or by a misfired shot, the latter of which may either start an intermediate gas explosion or may communicate its fire directly to the dust. The ordinary flame of an open lamp will not start a dust explosion, but it is possible that a large flame, from a torch, might do so. The initial stages of a dust explosion are not very violent, but after a time, the reaction becomes explosive.

Modern Reverberatory Smelting of Copper Ore--I

Application of the Reverberatory Furnace to the Reduction of Copper Ores. The Latest Furnace at Anaconda as an Example of Practice

BY C. OFFERHAUS*

The bulk of our copper ores are sulphide ores and the first concentration product in smelting them is matte, a product containing cuprous sulphide (Cu_2S) with variable quantities of ferrous sulphide (FeS).[1] Oxide ores, carbonate ores and silicate ores, which do not contain 'sulphur,' are frequently smelted with sulphide ores. By so doing advantage is taken of the property of sulphur to collect the copper in the form of matte and of the property of sulphides (matte) to separate from the slag (silicates).

Matte is produced in two types of furnaces, the reverberatory furnace and the blast furnace. The following notes will deal exclusively with the reverberatory furnace.

The use of the reverberatory furnace as a smelting furnace is by no means new. It had its origin in Swansea, Wales, where cheap fuel and a good refractory material, which are the main conditions for the financial success of the process, were at hand.

The Reverberatory Furnace

The main characteristics of the reverberatory furnace are:

1. The separation of the fuel and charge.

2. Heating of the charge by a flame, which reverberates the heat on it. Hence the English name "reverberatory furnace" and the German name "flammofen."

Fuel and charge, grate and hearth are respectively separated by a wall, the firebridge. The flame is drawn over the charge on the hearth by constructing a roof over grate and hearth and causing a draft toward the front of the furnace —that part of the furnace opposite the firebox. The type "reverberatory furnace" is extensively used in the chemical and metallurgical industry as a calcining furnace, roasting furnace, refining furnace, etc. In using it as a matte-smelting furnace, we need a very high temperature and we want a neutral atmosphere, i.e., not oxidizing and not reducing. The composition of the charge is such that we simply have to melt it down. We want, therefore, the maximum heat of the coal and nothing else; and to admit just enough air to burn it completely.

The Principles of Smelting

Let us assume a sulphide ore of the composition given below and let us see what will happen upon smelting this raw ore directly in the neutral atmosphere of a reverberatory furnace: Chalcopyrite, ($CuFeS_2$) x 10 per cent. pyrite (FeS_2) = 40 per cent.; a self-fluxing gangue, 50 per cent. This ore contains: Cu, 3.46 per cent.; Fe, 21.7 (2); S, 24.8 (2); gangue, 55.0 per cent.

In melting pure copper pyrite—($Cu.FeS_2)_2$ = 367—and pure pyrite (FeS_2 = 120) in the absence of air, we find that 367 parts of the former and 120 parts of the latter lose 32 parts of sulphur (S = 32). The following reactions take place:

$$\overset{367}{(CuFeS_2)_2} = \overset{335}{Cu_2S, 2FeS} + \overset{32}{S}$$

$$\overset{120}{FeS_2} = \overset{88}{FeS} + \overset{32}{S}$$

Smelting the above ore under the same condition will separate it in two layers, a heavier one, the matte, and a lighter one, the slag. Every 100 parts of ore will yield 50 parts of slag and 38.45 parts of matte, containing 9 per cent. Cu, 11.55 parts of sulphur going off as sulphur. The ratio of concentration

$$= \frac{\text{per cent. Cu in matte}}{\text{per cent. Cu in ore}} = \frac{9}{3.46} = 2.6.$$

The weight of the matte is $\frac{1}{2.6} = \frac{10}{26}$ of the weight of the raw ore. Therefore, the concentration was not a very effective one.

If we roast part of the sulphur off before smelting the ore, a much better concentration will result. For example: let enough sulphur be roasted off to cause the resulting material to contain 3 parts of sulphur for every 3.46 of copper. This sulphur will be present as copper and iron sulphides, sulphates, and basic sulphates; its form, however, is immaterial.

Melting the roasted ore on the hearth of a reverberatory furnace in a neutral atmosphere, adding in this case a silicious flux, to flux the excess of iron oxides, so as to produce a slag of a suitable composition, it will again separate in matte and slag.

Upon analyzing these materials we will find the slag practically free from copper and sulphur. All the copper and values (Au and Ag) are contained in the matte. A part of the sulphur is driven off as SO_2, as a result of reactions between oxides and sulphides; the rest we will find in the matte as sulphide sulphur. The iron is divided between matte and slag; it is practically all present as ferrous iron. A quantitative analysis of the matte will show, that, assuming the copper is present as Cu_2S, for every atom of the remaining sulphur there will be approximately one atom of iron. We may therefore adopt the following formula for the matte: Cu_2S, xFeS; taking care not to contribute more significance to it than it deserves.

The concentration and the composition of the matte, and in consequence the composition of the slag, depend, therefore, directly upon the sulphur content of the charge. The affinity of sulphur for copper surpasses that of sulphur for iron; the sulphur combines, therefore, in the first place with copper, forming Cu_2S (CuS is not stable at the existing temperatures); the rest of the sulphur combines with iron, forming FeS and the remaining iron goes into the slag as ferrous iron. Assuming that in smelting the above roasted ore one-third of the sulphur goes off as SO_2, the resulting matte will contain for every 3.46 parts of copper 2 parts of sulphur; 3.46 parts of copper require 0.87 part of sulphur to form Cu_2S; the remaining 0.13 part of sulphur requires 1.97 parts of iron to form FeS. The matte will therefore contain for 3.46 parts Cu, 2 parts S and 1.97 parts Fe; this corresponds to 46.5 per cent. Cu. The ratio of concentration

$$= \frac{\text{per cent. Cu in matte}}{\text{per cent. Cu in ore}} = \frac{46.5}{3.46} = 13.4;$$

before roasting the ore it was, as we will recall, 2.6.

The above example shows us then, that sulphide ores need a previous roasting to obtain an effective concentration, the concentration of the matte depending upon the amount of S in the charge. We may, however, obtain a charge of the desired composition by mixing raw sulphide ore with copper ores which do not contain sulphur or with dead roasted sulphide ore.

Up to the present our attention has been chiefly directed to the consideration of the matte. Matte of all compositions, however, melts at a comparatively low temperature and, its desired concentration once fixed, requires very little attention. The properties of the slag at the working temperatures of the furnace are greatly affected by its composition, and in consequence due consideration

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[1]For the constitution of matte see Gibb and Philip, *Trans.* Am. Inst. Mining Engineers XXXVI, p. 665; Paul Röntgen, "Zur Kenntniss der Natur des Kupfersteins," Metallurgie, 1906, p. 479. H. O. Hoffman; Constitution of Ferrocuprous Sulphides, *Trans.* Am. Inst. Mining Engineers, 1906 (LXXIII).

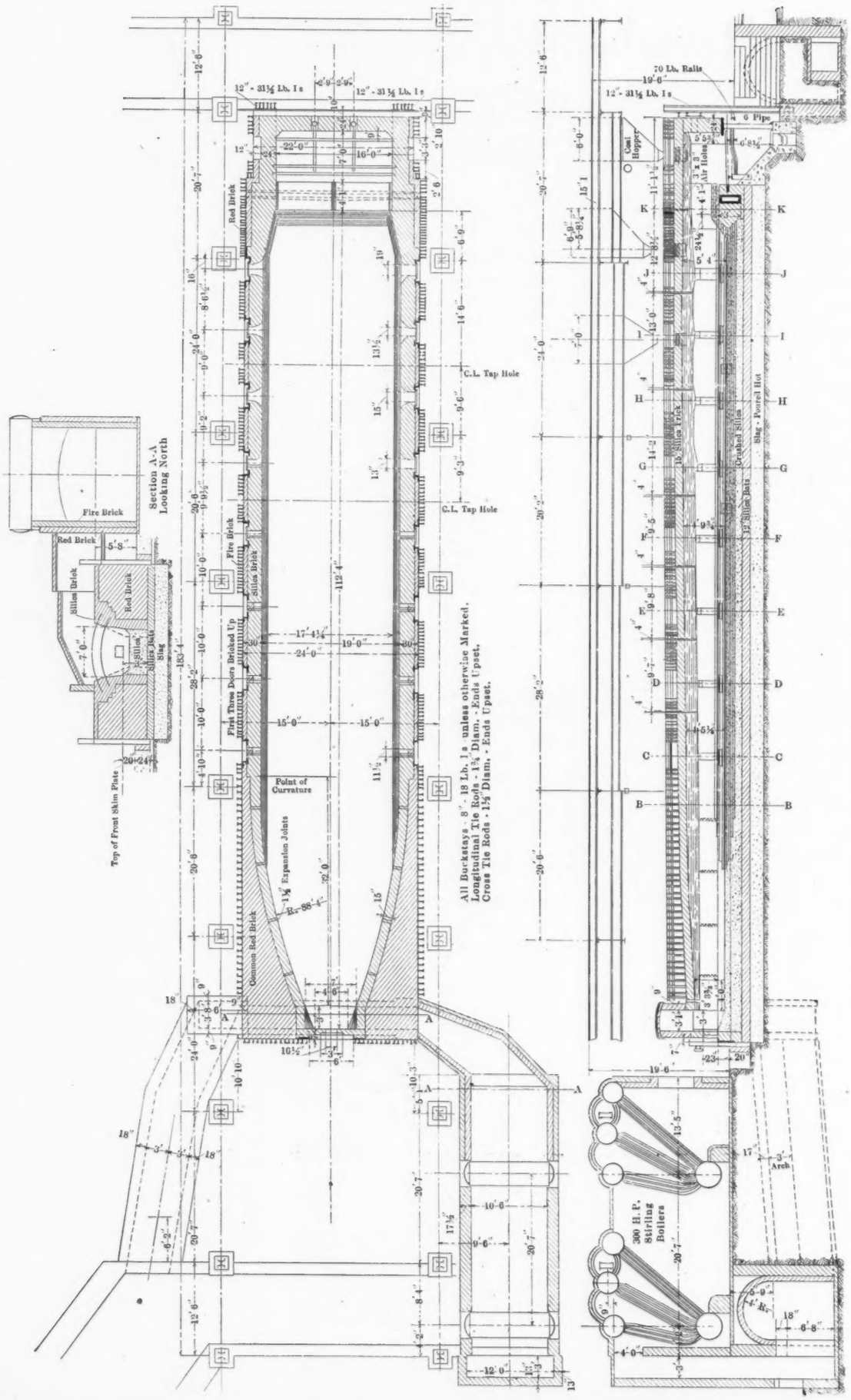


FIG. 1. SECTIONAL PLAN AND ELEVATION OF REVERBERATORY FURNACE AT ANACONDA

should be given to them. Moreover, the quantity of the slag produced, and consequently to be handled, is several times that of the matte. The composition of the slag must be such that it will be perfectly fluid at the temperature obtained in the reverberatory furnace and its specific gravity in this condition must not be too near that of the matte, in order to cause a clean separation of the latter. The slag should be as acid as the above conditions will permit, because the more acid the slag the less will be the tendency to corrode the sidewalls and hearth of the furnace, which are of silicious material.

The bulk of our sulphide ores have a pronounced silicious gangue, which requires a basic flux. In roasting these silicious sulphide ores, we not only prepare them so as to produce a matte of a higher concentration, but we also produce a basic flux (iron oxides) for the silicious gangue. To produce a slag of the desired properties, however, we will generally have to add some outside flux.

Reactions in the Reverberatory

Let us now consider what reactions take place in melting down a charge in a reverberatory furnace. The charge will generally contain iron and copper sulphides, sulphates and basic sulphates and oxides (Fe_2O_3, Fe_3O_4, Cu_2O, CuO). Many reactions are possible between these different substances and it is mainly the temperature which will govern them. As a final result, however, the copper will be present as Cu_2S; that part of the sulphur which does not go off as SO_2, will be present as Cu_2S and FeS and the excess of the iron will be found in the slag as ferrous iron.

The following are the main reactions which occur:

$$Cu_2S + 2\,CuO = 4\,Cu + SO_2.$$ [2]
$$Cu_2S + 3\,CuO = 3\,Cu + Cu_2O + SO_2.$$
$$Cu_2S + 6\,CuO = 4\,Cu_2O + SO_2.$$

$$Cu_2S + 2\,Cu_2O = 6\,Cu + SO_2.$$ [2]

$$Cu_2S + CuSO_4 = 3\,Cu + SO_2.$$
$$Cu_2S + 2\,CuSO_4 = 2\,Cu_2O + 3\,SO_2.$$
$$Cu_2S + 4\,CuSO_4 = 6\,CuO + 5\,SO_2.$$

$$CuSO_4 = CuO + SO_2 + O.$$
$$2\,FeSO_4 = Fe_2O_3 + SO_2 + SO_2.$$

$$FeS + 3\,Fe_2O_3 + x\,SiO_2 = 7\,(FeO, x\,SiO_2) + SO_2.$$

$$FeS + 2\,Cu = Cu_2S + Fe.$$
$$FeS + Cu_2O = Cu_2S + FeO.$$

$$Fe_2O_3 + Fe + x\,SiO_2 = 3\,(FeO, x\,SiO_2).$$
$$FeO + x\,SiO_2 = FeO, x\,SiO_2.$$

Part of the Fe_3O_4 goes as such into the matte. The reactions between oxides and sulphides, which cause liberation of SO_2 occur at 900 to 1100 deg. C., temperatures not obtained in the roasting furnace.

We will get later a quantitative idea of the above reactions in studying a concrete example.

[2] See F. O. Doeltz; *Metallurgie* 421; 1907.

Reverberatory Smelting as Practiced at Anaconda

The new Anaconda reverberatory smelting furnaces and the method of operating them, form a good example of modern reverberatory smelting. These furnaces differ from the older reverberatory smelting furnaces not only in size but also in the relative proportion of the different parts. Their main feature is that they are so constructed that a very high temperature (the average temperature measured above the firebridge is 1550 deg. C.), can easily be obtained and maintained. This is attained by having a large grate-area, which makes it possible to burn a large amount of coal; furthermore, a rational proportion between the area of grate and flue and a sufficient draft. The area of the grate once fixed, the length of the hearth will depend upon the temperature needed at the front of the furnace. Since it is advantageous and customary to construct a very heavy arch, the width of the hearth will be limited only by the ability to construct an arch strong enough and by the distance a man can throw the clay or fettling. The waste heat of the escaping gases is utilized by placing two 300-h.p. Stirling boilers in the flue of each furnace. The temperature of the gases just before entering the boiler tubes is 950 deg. C., and after having passed the boilers it averages 330 deg. C. A by-pass flue makes it possible to convey the gases directly to the reverberatory flue, if so desired. The water pumped into the boilers is kept at a constant level. The boilers blow off at 175 lb. Each furnace generates 600 h.p. constantly. The boiler tubes are not at all attacked by the gases; it is necessary, however, to clean them once a month of a white outside coating, containing a good deal of As_2O_3. This is done by blowing them on the outside once a shift and cleaning internally and scraping externally once a month.

Fig. 1 shows a sectional plan and elevation of this type of furnace and Table I gives the main dimensions and some of the construction details.

The main feature in operating these furnaces is, that a layer of matte from 4 to 13 in. thick is constantly kept in the furnace to protect the bottom. This, together with the thickness of the roof, and in consequence the weight, make a very strong bracing a necessity.

In order to gain an exact idea of modern reverberatory smelting, we will follow a 24-hour run in one of the Anaconda furnaces. In addition thereto, I will describe the starting up of a reverberatory furnace and the operation of claying.

Table II gives the time and the operations as they follow each other during an eight-hour shift. In connection with this table I will describe the operations.

TABLE I. SOME DIMENSIONS AND DETAILS OF THE ANACONDA REVERBERATORY FURNACES.

Length of hearth	102 to 116 ft.
Length of hearth, furnace No. 1	115.8 ft.
Width of hearth	19 ft.
24 ft. from the front, the furnace starts to taper toward the front. the width at the front being	7 ft.
The distance from hearth to roof at the front being	4 ft.
Fire-box	16x8 ft.
Outlet at the neck	60x38 in.
Area firebridge	3½x17 ft.
Distance from tap-hole to level of skimming plate	13 in.
Distance of hearth to level of firebridge	26 in.
Distance from grate to level of firebridge	27 in.
Distance from top of firebridge to crown of arch	64 in.
Distance from hearth to crown of arch	6.7 ft.
At 24 ft. from the front	4 ft.
Distance from sill side doors to top of skimming plate	18 in.
Thickness of walls	26 in.
Thickness of roof	15 in.
Size of roof-bricks (silica bricks)	15x6x3 in.
Side doors	8x15 in.
Skimming door	12x15 in.
Number of doors at each side: The five doors at each side nearest the front are blind. In side walls and roof 10 to 12 expansion gages 3 in. each, which close entirely upon heating; in the firebridge three transverse expansion joints, about 4 in. wide	10
Number of 8-in. I-beams at every side of the furnace	170
Number of tie-rods on the breadth of the hearth	50
Number of tie-rods in the breadth of the fire-box	5
Number of tie-rods in the length of hearth	2
Number of tie-rods in the length of hearth and firebox	6
(The I-beams are not tied by tie-rods underneath the furnace.)	
Diameter of tie-rods	2 in.
Bottom of furnace: 4 ft. thick of slag or concrete and 26 in. of sand (Dillon quartz). There is no vault under the bottom.	

All parts of the furnace exposed to the action of the charge and heat, as hearth, inside of side walls and roof, are of silica brick, parts only exposed to high temperatures of silica brick or firebrick, parts not exposed to high temperatures can be made of ordinary brick.

The silica brick are made in different shapes so as to avoid the necessity of cutting them.

The mortar used is of the same material as the bricks themselves. The sidewalls of the furnaces and the firebridge are stepped down from the level of the bridge and door-sills to the hearth for about 12 in. to strengthen the lower parts of walls and bridge and to prevent working down of the matte between the edges of the hearth and the inclosing walls.

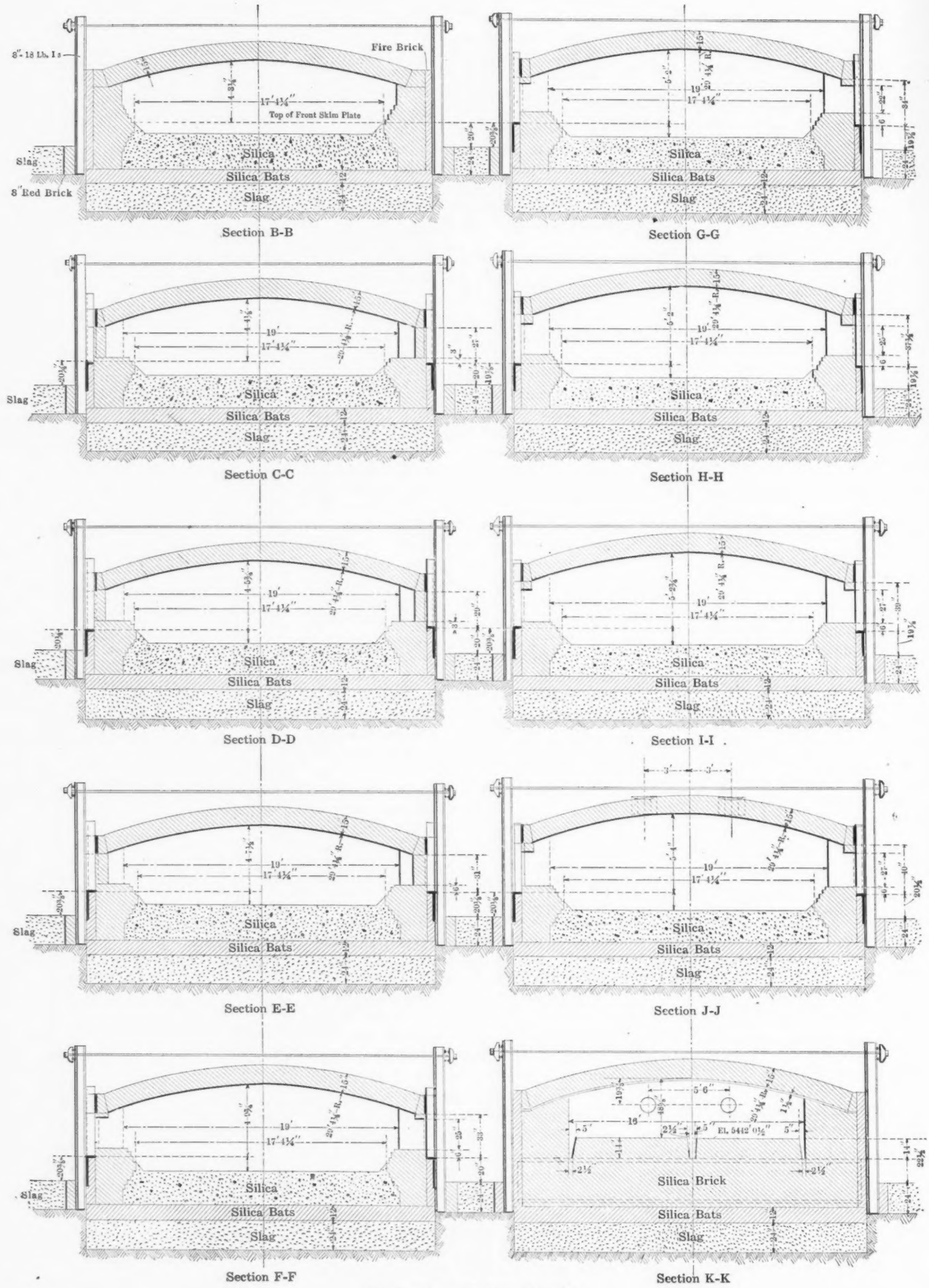
TABLE II.

Skimming	7.00–7.14
(Coal charged during skimming.)	
Side door opened	7.16–7.16½
Coal charged	7.28–7.31
Charged	7.52–7.57
Tapped	8.05–8.15
Coal charged	8.15
Coal charged	8.40
Grating	8.43–9.17
Side door opened and charged	8.54–8.59
Coal charged	9.05
Coal charged	9.27
Coal charged	9.49
Charged	10.07
Coal charged	10.25
Coal charged	10.41
Skimming	10.45–10.58
Coal charged	11.04
Charged	11.16
Some grating	11.16–11.35
Coal charged	11.35
Coal charged	12.03
Charged	12.04
Tapped (1½ ladle)	12.37–12.48½
Coal charged	12.45
Charged	1.00
Grating	1.11–1.45
Coal charged	1.26
Charged	1.44
Coal charged	1.51
Coal charged	2.18

Total charges made:
16 coal charges.
7 calcine charges.

Charging Coal.

The coal used is semi-bituminous; it contains 11 per cent. ash and 33 per cent. volatile matter. In the roof above



All Sections looking North

CROSS-SECTIONS OF REVERBERATORY FURNACE AT ANACONDA

the grate, there are four holes in a row, covered with sliding rectangular covers. Coal is charged from a hopper with four outlets corresponding to these four holes. In the front of the firebox there are two circular stokeholes 12 in. diam. They afford a means of determining the level of the coal, which is kept on the level of the firebridge. Coal is charged as regularly as possible. Table II shows that the time used in dropping the coal is from two to three minutes and that 16 coal charges are made during the shift. It is found that on the average a charge of about 3000 lb. is made every 40 minutes. In the roof above the firebridge there is a row of small openings (checker-holes; about 20 holes, 3x3 in.), for the admission of secondary air. A brick taken out of the outlet flue and the hole covered by a sheet of mica enables the fireman to see the appearance of the flame at a distance of about 120 ft. He opens or closes the checker-holes by means of bricks, so as to effect a complete combustion.

Grating

The grate is generally barred every four hours, this depending upon the quality of the coal. The clinkers are broken up with heavy bars, partly pulled out through the grate, and partly arranged so as to form a bed for the coal, leaving sufficient and equally divided spaces for the admission of air. Barring the grate is very strenuous work, mainly because one is continuously exposed to a high temperature. Breaking up the bridge clinkers is sometimes very hard. The time used in grating is usually from 35 to 45 minutes (see Table 2) and depends very much upon the quality of the coal received. A good deal of fine and partially burned coal falls through the grate, especially during the grating. (Grate-bars are 2 in. square and 6 in. on centers). It falls with clinkers and ashes into a stream of water, which carries them over a grizzly, the larger pieces going to the slag sluice, the smaller (unburnt coal and coke) being sluiced to a small jigging plant. About 10 per cent. of the total coal charged is jigged out here; it goes to the briquet plant and forms a part of the briquets charged in the blast furnace.

(To be continued.)

When inspecting wire hoisting rope, the person making the examination may stand in a safe position at the collar of the shaft and allow the rope to pass through his hand at a speed not to exceed 50 ft. per minute. Broken strands may be detected in this manner, while other defects, such as excessive wear, loosening of the strands, kinking, severe corrosion, etc., may be noted with the eye.

Shocks, due to a sudden jerk or change of velocity, are more dangerous to short hoisting ropes than to long ones.

Iron Ore in New Jersey

By Henry W. Kummel*

The center of the iron-mining industry of New Jersey is Morris county, in which are located the largest number as well as the most productive active mines. During 1907 the Wharton, Wood, De Camp and Andover mines at Hibernia, the Richard, Huff and Hurd at Wharton, the Elizabeth and Leonard at Mount Hope and the Dickerson at Ferro Monte, were all producers. In Warren county, the Shoemaker mine at Belvidere, the Ahles and Washington at Oxford, and the Beatyestown near Hackettstown, were worked more or less continuously. The Hude mine, near Stanhope, in Sussex county, and the Peters mine at Ridgewood, in Passaic county, were also producers. The chief producing mines are in the hands of a few interests. The mines at Hibernia and the Hurd mine at Wharton are controlled by Joseph Wharton; the Mount Hope mines and the Washington mine at Oxford are owned by the Empire Steel and Iron Company; the Thomas Iron Company owns and operates the Richard mine; and the Musconetcong Iron Company operates the Hude and Dickerson mines under lease. The Pequest company operates the Ahles and Peters mines, and the limonite mines at Belvidere and Beatyestown were worked by the Hudson Iron Company.

Character of the Ore

In all these mines with three exceptions, the ore is magnetite. The Shoemaker and Beatyestown mines produced a limited amount of limonite. The ore of the Ahles mine is a mixture of magnetite and limonite, carrying between 4 and 7 per cent. manganese. The composition of this ore dried at 212 deg. F., shown by published analysis[1] is as follows: Metallic iron, 47.650 per cent.; silica, 15.705; sulphur, 0.038; phosphorus, 0.092; manganese, 4.351; lime, 1.260; magnesia, 1.636; alumina, 1.347; combined water[2] not determined.

Much of the magnetite is high-grade ore. Over 1,000,000 tons (every shipment being sampled) from the Richard mine, shipped between 1894 and 1904, showed an average content of metallic iron of 60.19 per cent. In this ore the phosphorus averaged about 0.75 per cent.; silica, 6; lime, 5; alumina, 3. Some of the magnetites contain considerable sulphur (iron pyrites) which in the case of the ore from the Washington mine at Oxford furnace necessitates a preliminary washing by which the sulphur is reduced from about 5 to 0.7 per cent.[3]

Shape of Orebodies

In nearly all the magnetite mines the orebodies are most frequently long, flattened, pod-shaped masses, the longest axes of which pitch northeasterly at angles of from 15 to 25 deg. The median axes are nearly vertical, or dip to the southeast at angles greater than 60 deg. The thickness of the lenses or pods varies greatly, ranging from stringers of ore too thin to be economically worked, to 15 ft. thick in some cases. The Wharton mine on the Hibernia vein, where a depth of 1700 ft. has been reached, is the deepest iron mine now worked; although at the Hurdtown mine, one of the most famous of the New Jersey mines but abandoned several years ago, the orebody was followed down the pitch a distance of 6000 ft., or 2600 ft. vertically below the surface. The Hibernia orebody departs greatly from the typical pod-form, the ore occurring more like a steeply inclined bed of coal; but the northeasterly pitch is distinguishable in the ore and country rock.

Production

Although all conditions pointed to a decreased production of iron ore in 1907, the figures show a slight increase over those of 1906.

At the Richard mine, No. 5 slope was destroyed by fire so that the production was scarcely 75 per cent. of former years. Early in the year the Andover mine at Hibernia was shut down permanently. This mine is located at the southwestern end of the great Hibernia orebody, and with increasing depth the pitch of the deposit has carried the ore so far to the northeast that there was less and less which could be profitably worked from the Andover openings. The other mines on the Hibernia orebody were shut down about the middle of November owing to the general stagnation of the industry following the panic of October. The old limonite workings near Beatyestown were operated for a short time and a few hundred tons of ore mined, but the work ceased before the close of the year. The Shoemaker mines near Belvidere were also reopened, and were producing when the year ended. The total production of iron ore, as reported to the State geologist, was 558,137 tons, as compared with 542,488 tons in 1906. A complete report upon the iron-ore mines of New Jersey is being prepared by Prof. W. S. Bayley, and will be published soon by the State Geological Survey.

An ordinary quantity of water required for each ton of ore treated by concentration is 1000 gallons.

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*State geologist, Trenton, N. J.

[1]Annual report of the State geologist for 1904, p. 293.

[2]In addition to the chemically combined water, due to the fact that the ore is in part limonite, there is some hygroscopic or mechanically combined water in all soft ores of this character as they are taken from the mine. This does not show in the dried sample taken for analysis, but if an ore is very wet, it may make considerable difference in the amount of iron per ton of ore.

[3]Annual report of the State geologist for 1901, p. 136.

Mining and Transportation in Guatemala

By Clarence C. Sample*

Guatemala may be reached by taking any one of the several lines of steamships that stop at the Mexican ports of Acapulco or Salina Cruz on their southbound trips. The steamship companies publish a sailing schedule but it is seldom that one finds a steamer on a "sailing day." One may count upon a steamer every week, or, at least, every 10 days. After leaving Salina Cruz these steamers stop at the Guatemalan ports of Ocos, Champerico, and San Jose. Most travelers coming into Guatemala upon the Pacific side go to Guatemala City at once, which is reached from San Jose by 74 miles of railroad. The time taken for the trip from Salina Cruz to San Jose, depends upon how long a stop is made to load coffee at Ocos or Champerico; it may be five days or it may be ten.

The Hamburg-American line runs a single steamer from New York to Puerto Barrios on the Atlantic. It takes about 10 days for the trip but the interval between steamers is variable. The most regular service is that between New Orleans and Puerto Barrios. These steamers make the trip in five days.

Guatemala is an easy country to get into but to leave it is not always without difficulty. From June to September there is a quarantine at New Orleans against all ports south of Belize, and while one may come into the country from that port *via* the fruit company steamers, they are absolutely refused transportation in the other direction during the months of quarantine. Besides the quarantine, the government very carefully watches all who wish to leave the country; passports are required and it often takes a week to obtain one.

Railroads

The west coast of the country has been developed very much more than the east side. It is healthier in most places along the Pacific coast and on that side are situated the coffee lands, which constitute at present, the principal wealth of the country. Several short lines of railroad run into this coffee belt, but the most important line at present completed, is the Guatemala Central, running from the port of San Jose on the Pacific to Guatemala City, situated on a plateau 4700 ft. above sea level and 74 miles from San Jose. This road is narrow-gage, well built and over it are brought all imports for Guatemala City and vicinity.

It is expected that the Guatemala Railroad will be completed during 1908. This line was begun many years ago, to connect the Puerto Barrios on the Atlantic. The history of this road is that of many similar lines in Central America. The funds were exhausted before the completion of the road and for years an irregular, unsatisfactory service was kept up by the government. Later Sir William Van Horne, and Minor C. Keith obtained a concession from the government by which they obtained that portion of the road already built and the right of way into Guatemala City. Work was commenced upon the road at once and it is now almost completed. Most of the track has been laid, and with the completion of several large bridges, Guatamala will have a railroad service from coast to coast. This new line will be a little more than 200 miles long, and is narrow-gage. It follows the valley of the Motagua river for the greater part of its length.

Off the line of the railroads all transportation is done by ox cart or pack mules. In the immediate vicinity of the larger towns the roads are fairly wide and in such condition that ox carts may be used, but upon going farther from the towns, the roads become narrow, steep and good only for pack-mule transportation. The ox carts can carry loads of 1500 lb. The native mule of Guatemala is a diminutive, patient little beast hardly the size of a burro. A good mule can carry a load of 200 lb. but this is above the average transported for any great distance. The rainy season which lasts from June to October puts the trails in very bad condition, the rivers, which are almost dry in other seasons become swollen streams, too deep to ford; and bridges, except near the largest towns are unknown.

Mining

The attitude of the government toward the mining industry is not conducive to the best development of the mineral resources of the land. The law states emphatically that all mineral deposits, wherever they may be found are the exclusive property of the government, and this applies alike to private and public lands. The purchase of land does not give the purchaser any right to the minerals therein contained. Concessions to work any deposit may be obtained for varying periods of time, but the right in perpetuity will not be given under any consideration. Indeed the obtaining of a mining concession is far from easy; to my knowledge only three have been granted and these were obtained only after a long and tedious procedure. Concessions are only granted to those who have the means and who have promised as a condition of concession, to develop and operate the property. With the concession, freedom from import duty on mining machinery and supplies is given, also exemption from taxation for a given period.

There is no inducement held out to the prospector, for unless he can assure the government of his ability to carry on development, his chance of obtaining a concession is hopeless. Even with the means at hand it is often difficult to obtain a concession unless one is influential with the powers that be.

Labor

The labor situation in Guatemala is peculiar. The population is made up of Indians and *ladinos*. The former have more in common with the Indians of the Peruvian Andes than with the aborigines of Mexico. The *ladinos* are of Spanish descent. Needless to say the line of demarcation between the two, is not sharply drawn.

Under the law every native not a merchant or engaged in the professions is a soldier in the army, and subject to call for military service at any moment. Concessions are usually granted with a labor clause granting native laborers exemption from military service, except in time of war or revolution. The Guatemalan laborer receives from $2 to $3.50 a day, in paper money equivalent to 18 to 30c. gold. In the mountainous districts the labor is generally very good, as Indian labor goes. Six men working in two shifts will drive 10 to 14 ft. per week of 7x5-ft. tunnel, through hard limestone, doing all the drilling by hand and wheeling out the broken rock.

On the large *fincas*, or plantations, a system of peonage is in vogue. A laborer who owes $30 Guatemalan currency becomes almost a slave of his employer. Should he leave the place the owner may summon out a squad of soldiers to capture him and may place him in jail until willing to resume his tasks. Labor is scarce throughout the country and all *finca* managers are careful to keep their employees in debt.

The laborer brings his family with him when he comes to a place to work, and expects to be furnished with a little adobe shack and a small plot of ground on which to grow corn. Corn is his principal sustenance and the native expects that his employer will give him sufficient time at the proper season to sow, cultivate and harvest his crop.

With patience, a little consideration for his needs, and firmness of action when necessary the native Guatemalan Indian makes a docile laborer very easily handled.

Wars with neighboring republics and internal revolutions are frequent, and in such times all labor is drafted for military service often leaving a property without a single man. This is the greatest difficulty that the mine operator has to contend with for it leaves him without labor sometimes for months at a time.

Development of Mining

In the development of its mineral resources, Guatemala is outranked by all the other Central American republics. It has been stated that at one time there were 1500 mines in actual operation in the country, but what has become of them is a mystery. It is claimed that the *Conquistadores* sent to Spain a great quantity

*Mining engineer, Bluefields, Nicaragua.

of silver and gold, which was taken from Guatemalan mines, but in no part of the country can be seen the ruins of old treatment plants such as one would naturally expect to find in a country that had at one time been a great mineral producer.

In the department of Chiquimula, about where the boundaries of Salvador, Honduras, and Guatemala intersect, are found the Minas de Alotepeque. In this district an English company worked during the years 1860 to 1873. The San Pantaleon mine was the only one of importance that was worked by this old company. Official records show that about $40,000,000 worth of silver obtained from this mine was coined in the Guatemala mint; besides this the mine produced a considerable quantity of very rich ore which was shipped to Swansea for treatment. The method of barrel amalgamation was employed for extracting the silver. This mine was worked to a depth at which sulphides of zinc, lead and copper were encountered with only a small amount of silver. Amalgamation of this ore was out of the question, and a small charcoal furnace was built to smelt the ore, but the high percentage of zinc made the smelting difficult and the work was abandoned.

For a considerable area around this district enormous outcrops of a mixed ore of sphalerite, chalcopyrite, pyrites, and galena containing a little silver occur. For a long time no attention was paid to these outcrops until a few years ago when a company was organized under the name of Horta y Cie, which obtained a concession to work about 14 different claims for a period of 15 years. Two years ago an English corporation took up the task of developing these very promising prospects. The surface has been pretty thoroughly explored revealing the existence of several veins outcropping almost continuously for a long distance. Besides the mixed sulphide ores large bodies of calamine running high in zinc have been found almost at the surface. Being so near the frontier the wars and revolutions of the past two years have greatly hindered the progress of development.

At the present time the only paying mining work being carried on in the country, is at Las Quebradas de Oro, situated near the Honduran frontier at the foot of the Sierra de Merendon, about 14 miles east of the Motagua river opposite the town of Morales. Here occur rather extensive placer deposits. A portion of the placer ground is now being worked by John Knight, who has three monitors washing banks of gravel from 30 to 100 ft. thick. The value of the gravel is not made known but in a property near-by, panning showed about 15c. to the cubic yard.

The gravel in all probability was derived from the Merendon mountains and was deposited along the sides of what was at one time either a lake or an inlet of the sea. In most parts of the country the available water supply is too small to wash the gravel on an extensive scale. Knight's property is more favorably situated in this respect.

Another promising prospect has been recently investigated by Chicago capitalists. This is in the department of Baja Verapaz through which runs a vein or dike of pegmatite claimed to be more than 80 miles long. Muscovite mica is found in the vein in abundance and in books of considerable size. A little work has been done on one of these mica properties but no great depth has been reached. In thick books the mica seems black and opaque; in thinner sheets, semi-transparent and of a greenish tinge; in thinnest sheets the mica is perfectly transparent and water white. In rolling up a thin sheet into a hollow cylinder, the laminae split apart.

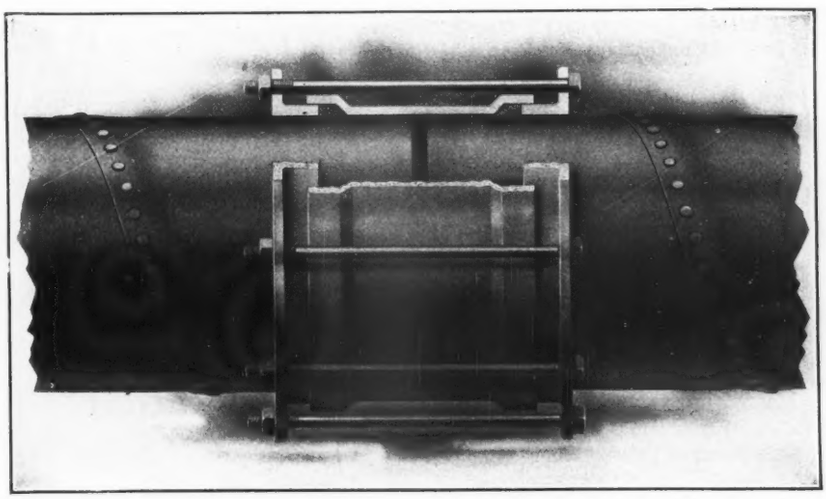
Many reports of the occurrence of lignite, argentiferous galena, copper, and gold placers are heard of from different parts of the country, but the number of really promising prospects is extremely small. For a long time to come the prospector will avoid the country, for at the present time the possibilities of his being able to obtain a concession after the discovery of mineral are too slight. Guatemala may have a future as a mining country, and from all reports it has had a past, but the value of her mineral production at the present time is a negligible quantity.

The Broken Hill Proprietary Company ships large quantities of lead directly to China, India and Japan. During the six months ending May 31, 1907, the sale of lead aggregated 24,372 tons, of which 16,954 were to Europe, 4831 to China, India and Japan, and 2587 to Australia and New Zealand. The Eastern trade is a growing and remunerative one. All of the lead sold in Europe is settled for at the average price ruling during the month of arrival. For all sales to China, Japan and India, also Australia and New Zealand, the price is fixed at time of sale.

Forged-steel Bolted Pipe Connection

The forged-steel bolted pipe joint lately introduced by the American Spiral Pipe Works, Chicago, is designed particularly for hydraulic purposes, and is made entirely of steel. It consists of two forged-steel flanges with necessary bolts, and a center sleeve or body recessed at both ends to allow for the insertion of beveled edge rubber, used as packing.

Connections with this joint are made in the following manner: The flanges are first slipped over the ends of both pipes to be connected, and the center sleeve or body is driven over one end of the pipe until it strikes an elevation on the inside of the sleeve. Then the other pipe is taken up and forced into the other end of the sleeve. Beveled strips of rubber, cut to the exact length to conform to the circumference of the pipe, are next placed on the pipe and pushed into the recess in the sleeve, or the space between the pipe and the center body. The flanges are next brought toward the body and bolts put in and drawn up evenly around the pipe. The hubs of the flanges engage the rubber causing it to expand, making the joint absolutely tight under pressures up to about 250 or 300 lb. The joint allows slight deflections in the pipe, so as to conform to changes in grade lines. The parts are made to fit sizes from 6 to 34 in., inclusive.



FORGED-STEEL BOLTED PIPE JOINT

The Canadian trade commissioner at St. John's, Newfoundland, reports (*Mining Journal*, May 2, 1908) the discovery of a rich copper deposit on the southeast side of the Red Indian lake, near the mouth of the Victoria river, on lands held by the Government. The area containing the deposit, extending over 16 miles, has already been taken up by a firm which owns lands on the opposite side of the lake, where a deposit of zinc ore has been found.

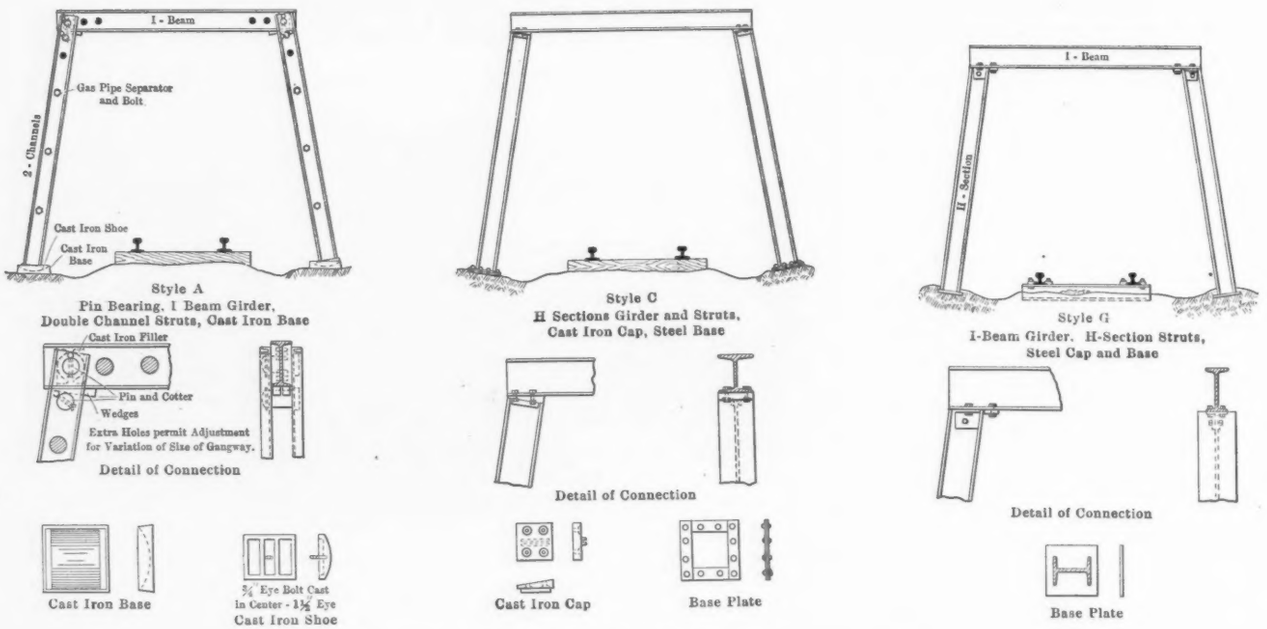
Steel Supports for Mine Drifts*

By R. B. Woodworth†

The use of steel in mines is not at present to be looked upon in any way as an experiment inasmuch as steel gangway supports have been used for the last 12 or 15 years in the mines of the Susquehanna Coal Company. There are deep parts of the mines where they are exposed to constant contact with mine water, but they show no signs of failure or corrosion. The first use of steel by the Susquehanna Coal Company marks approximately the time when the mine operators of this country began to realize the importance of making provision for the replacement of wood, due to its increasing scarcity and cost.

The form of construction designed by R. V. Norris, in which provision is made for adjustability both at the top and bottom, pin connections being used at the top and rocker castings at the bottom, is shown in the accompanying illustration, Style H. Steel wedges are driven at the bottom of the beam so as to distribute the weight on two pins, and additional holes are provided to take up differences in levels. It will be noted that in this form of construction it is necessary to assemble one beam, four fillers, two wedges, four pins and cottars, four channels, four shoe castings, six pieces of cast pipe and six bolts, 31 pieces in all. In ordinary practice beams and channels are bought from the steelmakers and castings from a foundry, pins from a structural shop or bridge company, bolts and separators from still other parties, making, as a rule, about four different sets of purchases. This makes the cost of this form of timber comparatively high, and there is needed some form of construction which will be equally strong but more convenient to manufacture and simpler to erect. It is but fair to say, however, that a large proportion of the steel supports now in use at mines have been patterned after this form, and where great strength is required, it will be necessary, and simple as well, to use steel beam collars, framed in between double channel legs, as shown in this arrangement.

At the Windber mines of the Berwind-White Mining Company, 125 sets of this general arrangement are in use. The collars are 12-in. beams 12 ft. long, and the posts are made of 8-in. channels; 1¾-in. pins are used throughout. The plain material was furnished by Pencoyd Iron Works, and the fabrication was done by the mining company's employees in their own shops. Similar sets are used in the mines of the Lykens Valley Coal Company at Williamstown, Pennsylvania.


I - Beam
Gas Pipe Separator and Bolt
2 - Channels
Cast Iron Shoe
Cast Iron Base
Style A
Pin Bearing. I Beam Girder, Double Channel Struts, Cast Iron Base
Cast Iron Filler
Pin and Cotter
Wedges
Extra Holes permit Adjustment for Variation of Size of Gangway.
Detail of Connection
Cast Iron Base
¾ Eye Bolt Cast in Center - 1½ Eye
Cast Iron Shoe
Style C
H Sections Girder and Struts, Cast Iron Cap, Steel Base
Detail of Connection
Cast Iron Cap
Base Plate
I - Beam
H - Section
Style G
I-Beam Girder. H-Section Struts, Steel Cap and Base
Detail of Connection
Base Plate

DIFFERENT FORMS OF STEEL FRAMES USED IN MINING

Improved Form of Steel for Mine Support

Observation and experience, however, indicates that adjustability is not needed in the steel timbers any more than in the wooden timbers whose place they are to take. It is also apparent that the problems of erection can be more fully and satisfactorily met if simplicity is made a large feature of the ideal construction, and for the legs of the square mine timbers and for props it has been apparent for some time that in the United States at least the most economical section has not been rolled. Nature builds the strongest sections in the form of hollow cylinders which have the largest radius of gyration for the least given weight of material, and, therefore, the greatest strength. Round sections, however, are not simple, and to make connection thereto is difficult and intricate. Therefore, it is necessary to look for as close an approximation to circular form as is possible under present conditions. This is given in the H section, a form of rolled shape which possesses a large radius of gyration and the most economical distribution of material in comparison to its weight, and which is especially adapted for use in mining operations. The first manufacturer to furnish these in the United States was the Carnegie Steel Company, and its 4-, 5-, 6- and 8-in. sections, all of which are now successfully rolled, have been designed especially for use in coal-mining operations. The 4-in. section weighs 13.6 lb. per lineal foot, the 5-in. 18.7 lb., the 6-in. 23.8 lb., and the 8-in. 34.6 lb., which gives a range of sizes sufficient to take care of all of the ordinary requirements of coal-mining operations, and whose simplicity is plainly proven in types of construction shown in the figures.

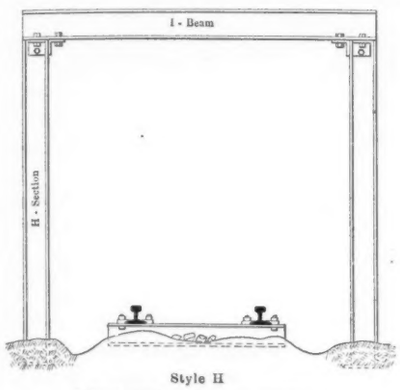
The form shown as Style F is perhaps the simplest form of construction adapted for mining purposes. It consists of a beam collar, two H-sections lug angles at the top thereof to prevent side motion, and absolutely plain plates for bearing. This form of construction has been successfully applied in the mines of the Midvalley Coal Company, and is specified for 150 sets of the Lytle Coal Company, and 25 sets for the Pine Hill Coal Company, and is believed to represent the ideal form

*Abstract of an article entitled "New Forms of Steel for New Uses," in *Proceedings* of Engineering Society of Western Pennsylvania.

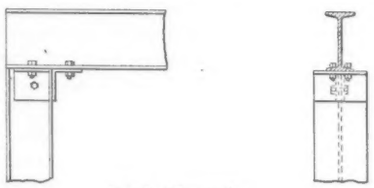
†Carnegie Steel Company, Pittsburg, Penn.

for this purpose. If the bearing plates are omitted, there are practically three pieces to handle. The set can be put together on the ground, and raised into position with a minimum of difficulty.

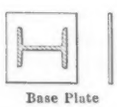
Style G is a similar form of construction with the exception that instead of angles, square bars bolted to the lower flange of collar, are used to prevent side motion. This form has been adopted by the Lehigh & Wilkes-Barre Coal Company for the construction of about 60 sets of square mine timbers at Maxwell Colliery No. 20, Ashley, Penn. When this material is used for pump houses, H-sections can be furnished perfectly square and guide angles at the top also square, as shown in Style H. Style C is a form of construction adapted for lighter loads where the span is not too great to require more than an H-section as support. It consists of an H-section collar, H-section legs, simple base plates if required, and cast-iron cap to distribute the load from the collar to the legs, and has protecting lugs to prevent undue side motion. With this form of construction, H-sections are absolutely plain. They can be cut to length either at the shop or at the mines, as desired.



Style H
I-Beam Girder, H-Section Struts, Steel Cap and Base

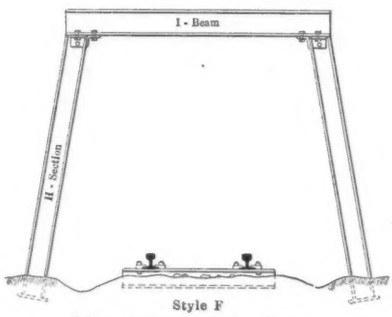


Detail of Connection

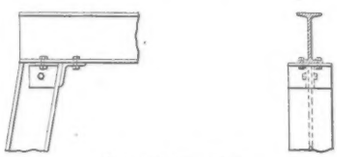


Base Plate

STEEL DRIFT TIMBERS



Style F
I-Beam Girder, H-Section Struts Steel Cap and Base



Detail of Connection

Base Plate

SIMPLE FORM OF STEEL SUPPORT

The average cost of mining to the Broken Hill Proprietary Company, inclusive of development work, during the six months ended Nov. 30, 1907, was 15s. 8.4 d. per ton against 14s. 7d. per ton in the previous semester.

A New Volumetric Assay for Copper

G. S. Jamieson, L. H. Levy and H. L. Wells (*Journ.* Am. Chem., Soc., XXX, 760-764) have described a volumetric method for the determination of copper based on the titration of cuprous thiocyanate with potassium iodate solution in the presence of a large excess of hydrochloric acid. The reaction depends on the formation of iodine monochloride and the disappearance of the iodine color imparted to an immiscible solvent such as chloroform or carbon tetrachloride. The reaction takes place rapidly and quantitatively according to the following equation:

$$4\,CuSCN + 7\,KIO_3 + 14\,HCl = 4\,CuSO_4 + KCl + 7\,ICl + 4\,HCN + 5\,H_2O.$$

Organic substances are generally inactive toward iodine monochloride, so that filter paper may be present during the titration. Ethyl alcohol, acetic acid, formic acid and formaldehyde do not interfere with the iodate titration. Lead, antimony and silver do, however, interfere, and must be removed. Pure normal iodate is used and 5.892 grams of the salt per liter, or some multiple of that weight, will give a solution containing exact milligrams of copper per cubic centimeter. It is well, however, to standardize the solution against pure copper.

Method

To 0.5 gram of the ore in a 6-oz. flask, add 6 to 10 c.c. of strong nitric acid, and boil gently, best over a free flame, keeping the flask in constant motion and inclined at an angle of about 45 deg., until the larger part of the acid has been removed. If this does not completely decompose the ore, add 5 c.c. of strong hydrochloric acid and continue the boiling until the volume is about 2 c.c. Now add gradually and carefully, best after cooling somewhat, 6 c.c. of strong sulphuric acid, and continue the boiling until sulphuric-acid fumes are evolved copiously. Allow to cool, add 25 c.c. of cold water, heat to boiling, and keep hot until the soluble sulphates have dissolved. Filter into a beaker and wash the flask and filter thoroughly with cold water. Nearly neutralize the filtrate with ammonia and add 10 to 15 c.c. of strong sulphur-dioxide water. Heat just to boiling and add 5 to 10 c.c. of a 10-per cent. solution of ammonium thiocyanate, according to the amount of copper present. Stir thoroughly, allow the precipitate to settle for 5 or 10 minutes, filter on paper, and wash with hot water until the ammonium thiocyanate is completely removed.

Place the filter with its contents in a glass-stoppered bottle of about 250-c.c. capacity, and by means of a piece of moist filter paper transfer into the bottle also any precipitate adhering to the stirring rod and beaker. Add to the bottle about 5 c.c. of chloroform, 20 c.c. of water and 30 c.c. of concentrated hydrochloric acid (the two latter liquids may be previously mixed). Now run in standard potassium-iodate solution inserting the stopper and shaking vigorously between additions. A violet color appears in the chloroform, at first increasing and then diminishing, until it disappears with great sharpness. The rapidity with which the iodate solution may be added can be judged from the color changes of the chloroform.

In order to make another titration it is not necessary to wash the bottle or throw away the chloroform. Pour off two-thirds or three-fourths of the liquid in order to remove most of the pulped paper, too much of which interferes with the settling of the chloroform globules after agitation, add enough properly diluted acid to make about 50 c.c. and proceed as before. In this case, where iodine monochloride is present at the outset, the chloroform becomes strongly colored with iodine as soon as the cuprous thiocyanate is added, but this makes no difference with the results of the titration.

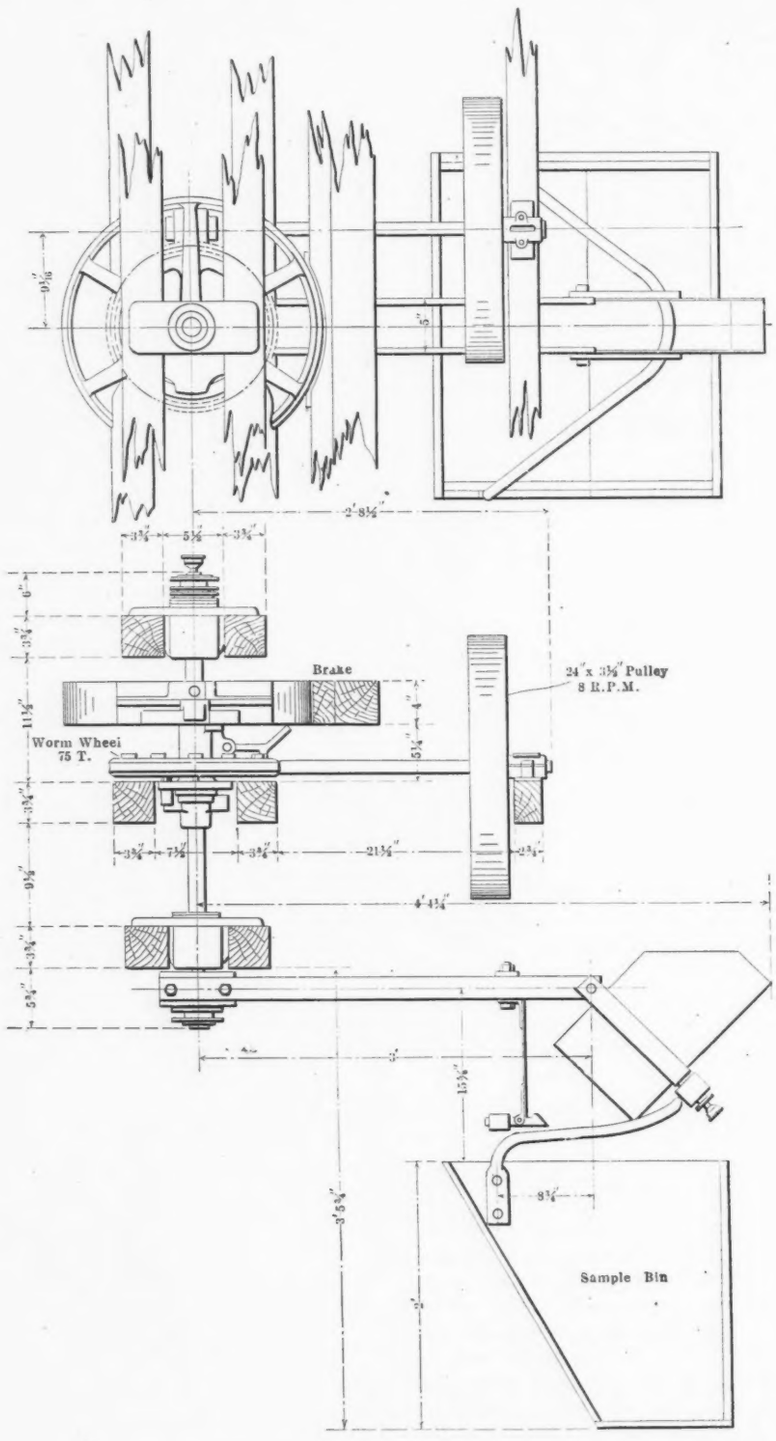
The authors have obtained very satisfactory results on various classes of material and have been able to make a complete determination in an hour. In comparison with the iodide method, with its large excess of potassium iodide, the iodate method is probably cheaper.

Slow winding with large loads will give longer life to a hoisting rope than quick winding with small loads.

Dressing for wire hoisting rope should be free from acid.

The Cole Sampler

The accompanying illustration is a drawing of an ore sampler, originally designed and installed by David Cole, assistant general manager of the Cananea Consolidated Copper Company, at Cananea, Mexico. It is now manufactured by the Allis-Chalmers Company.



THE COLE SAMPLER

This sampler consists of a cutting arm mounted on a vertical shaft and is intended to cut a sample at intervals by passing the cutter through a stream of ore as it is discharged from a belt conveyer, or other similar carrier. The sampler is driven by a countershaft and worm gearing, the ratio of the worm gear being 75 to 1. The speed of the countershaft is about 8 r.p.m., and the driving pulley is 24x3½ in. The worm wheel is loose on the vertical shaft, and drives the brake wheel through a flat spiral spring. Provision is made for adjusting the amount of tension to be applied on this spring so as to regulate the speed at which the cutter will pass through the ore stream, thereby determining the size of the sample taken. The speed of the machine is constant; and, when driving the pulley at 8 r.p.m., it will take a sample about every 10 minutes. The brake wheel has a segment about 90 deg. cut-out and the driving spring rotates this brake wheel until it reaches the point where the segment does not come in contact with the brake, thereby releasing the spring, which causes the cutter to pass rapidly through the stream of ore. The cutter travels on a radius of 3 ft. It is 5 in. wide and is arranged to be discharged automatically by a guide roller, which passes over a tripper, discharging the sample into a small sample bin conveniently located for this purpose. This sampler is suitable for crushed ore not exceeding about 1 to 1½ in. in size.

Lead Ore in Southeastern Missouri

In the disseminated lead district of southeastern Missouri, there is no vein structure, no crushing or brecciation of the inclosing rock, but the orebodies have well defined axes or courses, and remarkable reliability and persistency. The limestone is usually darker, more porous, and more apt to have thin seams of very dark (organic) shale, where it is ore-bearing, than in the surrounding barren ground. The orebodies, however, fade out gradually, with no sharp line between the pay-rock and the non-paying, and the lead is rarely, if ever, entirely absent in any extent of the limestone of the region. While the main course of the orebodies seems to be intimately connected with the axes of gentle anticlinal folds, numerous cross-runs of ore that are associated with slight faults are almost as important as the main shoots, and have been followed for 5000 ft. in length. These cross-runs are sometimes richer than the main runs, at least near the intersections, but they are narrower, and partake more of the type of vertical shoots, as distinguished from the horizontal sheet-form.

The ore of Leadville, Colo., occurred in shoots, or channels, of great size and remarkable continuity, of which a large number, approximately parallel in their courses, and to a considerable extent connected with one another by arms or branches, were opened. From the surface to the water-level the ore was lead carbonate (cerussite) and lead sulphate (anglesite), imbedded in a great body of manganiferous limonite; below the water level it consisted chiefly of a mixture of blende, galena, and pyrite, changing in the case of several shoots to nearly pure pyrites, occasionally cupriferous to a small extent. In the deposits of mixed sulphides there were found important masses of high-grade galena.

Anaconda Copper Mining Company

The report of this company for the year ended Dec. 31, 1907, which has just been published, gives some interesting particulars regarding its great properties in the Butte district in Montana; although the details are not as full as might be desired. The capital stock remains unchanged at $30,000,000. Current assets at the close of the year were $11,035,750; current liabilities, $2,318,115.

Financial Results

The income account for the year may be stated as follows:

Copper, gold and silver delivered to buyers	$12,038,715
Increase in metals on hand	696,640
Royalties, dividends, rentals, etc.	128,494
Interest	581,282
Net profits subsidiary departments	230,447
Total receipts	$13,675,578
Mining expenses, inc. development and depreciation	$ 5,241,704
Ore, matte and copper bought	210,630
Transportation, mines to works	153,140
Reduction expenses, inc. depreciation	3,640,296
Transporting, refining and selling metals	997,939
Administration expenses	53,649
Total expenses	$10,297,358
Net profits for the year	$ 3,378,220

In calculating increase of metals on hand, a deduction of $163,105 is made for loss on realization of copper. On the basis of tonnage worked at the reduction plant, the total earnings were $11.85 per ton; expenses, $8.92; net earnings, $2.93. Disregarding gold and silver, the total earnings were 21.69c. per pound of copper, and the net earnings 5.36c. Deducting assumed value of gold and silver, the receipts for sale of copper were 17.85c. per lb.; but this is not exact, as the quantities sold are not given.

The division of expenses was as follows: Mining, 50.9; transportation, etc., 3.5; reduction expenses, 35.4; shipping, refining and marketing, 10.2 per cent. of total.

The profit and loss account shows for the year:

Balance, Dec. 31, 1906	$ 9,183,242
Profit for the year 1907	3,378,220
Total	$12,561,462
Dividends 26, 27, 28, 29, being 21 per cent.	6,300,000
Balance, Dec. 31, 1907	$ 6,261,462

The net profit for the year was 11.26 per cent. on the capital.

Mining Results

The mines of the company produced during the year 1,123,692 wet tons of ore.

Considerable development was done in most of the mines during the year, the large part of it being lateral development; the only shaft deepened during the year being the High Ore, which was sunk 293 ft., the depth at the close of the year being 2880 ft. A station has been cut on the 2800-ft. level, but no development of the veins has been made below the 2600-ft. level. At the time of the last annual report it was stated that the main Anaconda vein had been cut and levels driven on the 2000-ft. level of the St. Lawrence, 2200 and 2400 of the Anaconda, and the 2200 of the Never Sweat. There has been practically no stoping done on these levels during the year past, but at the time of resumption of operations in March, stoping at various points on these levels was commenced, as it is desirable now to mine a higher grade of ore than was done during the early part of 1907. The south vein in the Anaconda group has been opened on the 1800-, 2000- and 2200-ft. levels of the Anaconda, and, for the entire distance developed, the vein shows good width of ore of such a grade that it is estimated one-half of it as shown now is smelting ore. In the St. Lawrence mine in the upper levels a new vein was opened for a distance of 500 ft. in length, showing ore of good width and good concentrating grade.

In the Diamond mine, the south vein mentioned in last year's report as having been opened on the 700-, 900,- 1300- and 1500-ft. levels has since been opened on the 1600-ft. level; extended drifts and raises show the same satisfactory width and grade of ore as mentioned last year for a very considerable length, and the tonnage exposed in this vein is considerably larger than at the close of 1906.

No new developments have taken place in the other mines of the company, but orebodies opened up during the year have proven more new ore in sight than was extracted. The Never Sweat mine, on account of an accident to the hoisting engine necessitating extensive repairs, was not in operation after the middle of May.

Electric locomotives have been installed on several levels of the Anaconda group and are giving satisfactory results in efficiency and cost of haulage.

A new compressor building was erected at the Diamond mine and the plant is now in full operation. In contains four electrically-driven air compressors, with a total capacity of 16,000 cu.ft. of air per minute, all fitted with steam cylinders for use in case of failure of electric current. The compressors were taken from different mines and only two new low-pressure cylinders, 38¼x48 in. were added. Four new 600-h.p. alternating-current electric motors, two circulating pumps, and four five-ton traveling cranes were purchased and installed.

The Never Sweat compressor plant now consists of five compressors, with a capacity of 32,000 cu.ft. of air per minute; two of the largest being electrically driven. This plant is connected with the Diamond plant by a water pipe, so that water can be pumped from one plant to another, and the two are connected with all of the mines of the company and the compressor plants of the Boston & Montana Company so that in case of accident at any of the most important compressor plants of the district, air can be furnished by the others to keep the mines in operation.

Reduction Works

The total quantity treated at the reduction works was 2,582,611 tons, of which 1,428,966 tons were for other companies. The cupreous material treated for the Anaconda company was: Ore from the mines, 1,110,203 tons; concentrates, 2966; slimes, 16,250; slag from old works, 24,226; total, 1,153,645 tons. The yield of this Anaconda material was 63,055,661 lb. copper, 2,001,351 oz. silver, and 8290 oz. gold; the averages being 2.73 per cent. copper, 1.73 oz. silver and 0.007 oz. gold per ton. These metals were all shipped to Eastern refineries in the form of anodes.

Since February, 1907, electric power has been used at the concentrator and in other departments of the works. This power has been found efficient, and the cost is much below that of steam for the same work. The large part of the electric power furnished at the works is brought in from the Missouri river, but during the year the Flint creek water-power and electric plant has been furnishing a considerable amount of current, and the Washoe company installed in its substation at the works three 400-kw. transformers, one voltage regulator for the city lighting system, and additional switchboard capacity for the new blast-furnace blower house. In the smelter power house there were installed one 600-h.p. motor, one 750-h.p. motor for blowing engines, and one 600-h.p. motor for air compressor. An entire new blower building was constructed, with 15-ton crane for handling machinery, four 600-h.p. motors and four blowers, each with a capacity of 36,000 cu.ft. of air per minute. This plant was just about ready for operation at the time of suspension of work late in the year. The McDougall building was extended, and eight additional roasters with equipment completed during the year. The extension to the reverberatory building and equipment was completed, and one new furnace of regulation type was installed, and extension to the converter building and equipment was partially completed. Two new slag conveyers, one new 60-ton crane, foundations for three additional converter stalls, and other improvements in this plant are under way, most of the material being on the ground. The Silver Lake pumping station was completed during the year, and electric pumps installed.

Improvements were made at the limestone quarry, and electric power is being installed.

The first unit of the precipitating plant on the tailings dump at the old works was in operation from April to October, inclusive. A satisfactory quantity of copper was produced at a low cost. Another plant is to be installed on the tailings dump at the old upper works.

Subsidiary Departments

The coal mines at Belt produced 233,298

tons of coal, of which 16,112 tons were used at mines; 106,594 shipped to other departments of the company; 110,592 tons sold. The sawmills at Hamilton made 24,475,111 ft. lumber of which 5,463,000 ft. were used by the company and the rest sold. The brick works at Anaconda extended their commercial trade.

The Butte, Anaconda & Pacific Railway earned $1,134,767 gross, the amount being reduced owing to a material decrease in rates charged on ores, fuel and flux. Expenses and taxes were $973,981, leaving net earnings, $160,786; from which a total of $60,000 was paid in dividends, and $100,786 carried to surplus.

Labor Conditions

Early in the year 1907 the conditions were such that it was considered advisable to grant a general advance in wages; contracts were entered into with labor unions holding in their membership nearly all of the employees of the company. These contracts provided for an advance in wages during the time when high prices prevailed for copper, and in the month of October, the price having receded below the dividing line, wages in all departments of mining and smelting were reduced in accordance with the contracts, to the scale prevailing early in 1906. The contracts made with the labor unions were complied with in all respects without any attempt at evasion on the part of either party.

General Remarks

The directors' report says: "The mines and reduction works of the company were operated fully from the beginning of the year until Sept. 1, except for some interferences with operations resulting from the extreme cold weather, which delayed transportation of ore and fuel during the months of January, February and March. The condition of the metal market and the accumulation of unsold product, commencing with July, made it desirable, in the opinion of your trustees, to restrict the expenditures and the output of copper until such time as the market would absorb the product, and commencing with September the production was sharply curtailed, until it reached as low a point as 35 per cent. of the normal. General business and financial conditions throughout the country later preventing any recovery in the market for metals, and the low rate of production making necessary increased costs of copper, your trustees decided at the beginning of December to close the mines and works of the company entirely, until conditions above named should show improvement. The high price of copper prevailing during the first six months of the year, during which months the large part of the production was made, made it seem advisable to treat ores of a lower grade than have been extracted in any previous period in the company's history. Much of the product resulting from the treatment of these ores was not marketed until the late months of the year, when the price of copper had receded to a point where the profit on this production was much smaller than had been anticipated, as the product of ores mined as early in the year as March was not sold until the latter part of the year, at prices 10 to 12c. per lb. lower than were ruling at the time the ore was extracted. The copper on hand at the end of the year was produced during the period of curtailment and cost $163,105 in excess of the amount realized from its sale. In order to keep this loss in the year during which it was made the amount has been deducted from the profits of the year. All these conditions have resulted in a profit very much less than anticipated by your trustees at the beginning of the year. Since the close of the year under review, the mines and works of the company were not in operation during January and February. In the early part of March work was again started, and in the latter part of the month production had about reached the normal. At the time of writing this report production figures and rough costs for March and April are at hand, and show a considerably higher grade of ore and a lower cost per pound of copper than have been realized at any time during the last few years."

Detinning Scrap

A method for treating tin scrap, and the apparatus employed (U. S. Patents 883,210; 883,211; 883,410 and 883,411, Mch. 31, 1908) is described in the *Journal* of the Society of Chemical Industry of May 15, 1908. The scrap is heated in a deoxidized atmosphere and torn apart, while still hot, by sets of teeth working against each other and by means of a cutting arrangement. The apparatus may consist of a revolving cylinder, slightly inclined to the horizontal and having an opening at the upper end for the reception of the material, the discharge being made at the lower extremity through an aperture sealed against the atmosphere. By some arrangement at this latter point, a heated deoxidized atmosphere is maintained within the apparatus. The combustion chamber at the lower end is surrounded with projections which can be rapidly revolved, similar projections being provided on the internal walls of the exterior cylinder. The removal of the tin is afterward effected, in a closed chamber, by surrounding the scrap alternately with dry chlorine gas and anhydrous stannic chloride. The apparatus for this consists of a detinning chamber which can be exhausted of air, when necessary, after the removal of the chloride. Before recharging with chlorine gas the chamber may be cooled in order to condense any vapors.

Spelter used for galvanizing should contain as little iron as possible.

The Selection of Spelter in Brass Making

In brass-making, spelter is frequently, though erroneously, considered of far less importance than the copper which is used. It is pleasing to find, says the *Brass World*, that more attention is now being paid to it than in the past. It would be unwise for a brassfounder who makes ordinary castings to use a highly refined spelter, as the cost is nearly double that of the ordinary grades, and no benefit would be derived from it. On the other hand, sensitive mixtures, such as cartridge brass or German silver could not be made in a satisfactory manner were common grades of spelter to be employed. The sheet would not stand the necessary drawing and grading without cracking.

The common grades of spelter usually contain considerable iron and lead, but not enough to injure them for making brass castings or for use in galvanizing. In the manufacture of brass sheet, however, the iron hardens the metal so that a spelter low in iron and containing only a moderate quantity of lead is required. Lead does not injure the brass in many instances, and in such mixtures as screw rod, clock brass, or other free-working mixtures it is added intentionally. As long as the iron content is not too high, brass can be used, although it may contain some lead.

In the manufacture of cartridge brass, german silver, spinning brass, and other fine grades of copper alloys to be rolled or drawn, the "Bertha" or "Horsehead" brands of spelter are almost exclusively used. They are almost free from lead and iron. In the manufacture of spelter castings, too, or those made in metal molds for use in lamps, clocks and other ornamental work to be afterward plated, those brands are exclusively employed, as they have been found the only ones that successfully cast without cracking.

Determination of Titanium

G. W. Wdowischewski in *Bergjournal* (St. Petersburg) 83, IV, 1907, p. 320, describes a method for precipitating titanium quantitatively and free from iron, which is difficult to accomplish by the ordinary methods. The ferro-titanium is dissolved in moderately dilute sulphuric acid, and the solution treated with some nitric acid. After filtering out the silica, and adding tartaric acid and ammonia to the filtrate, it is treated with hydrogen sulphide to precipitate the iron, which is then filtered off. The tartaric acid in the filtrate is then decomposed by the addition of more nitric acid, with heating, and from the colorless solution titanic acid is precipitated in the form of white flakes, free from iron, by the addition of ammonia.

The Mining and Metallurgical Society

In a bulletin just issued, the Mining and Metallurgical Society of America has announced the following outline of the purposes of the society as suggested in the preliminary correspondence among those who became the charter members and as developed in the discussion at the organization meeting. It is contemplated that the society will enter immediately into five principal fields of activity, as follows:

(1) The establishment of local sections, to promote acquaintance among the members, good fellowship, and the interchange of views respecting technical and professional matters. It is intended that these local sections shall hold frequent meetings, probably once a month, all of the sections to hold their meetings on the same day. It has been suggested that these meetings take the form of a dinner or smoker, to be followed by conversation and discussion. Such action as may be taken upon matters of interest will be reported to the general secretary and published in the monthly bulletin of the society. If in the opinion of the council of the society any matter be of such general importance as to deserve discussion by all of the sections, they will be requested by the general secretary to take it up. In addition to the meetings of the local sections, there will be in each year at least one meeting of the whole society.

(2) The determination of standards in engineering practice, such as is being done by the Institution of Mining and Metallurgy. The institution has from time to time appointed committees to consider technical questions as to which there is confusion, with the view to recommending a standard of practice that all members of the institution are urged to adopt. Among the questions that have been taken up by the Institution of Mining and Metallurgy are the definition of what constitutes the development of ore, the establishment of a standard of screens for use in screen analysis, and an agreement as to weights and measures commonly employed in mining and metallurgical work. Efforts to secure standardization and uniformity of methods have also been made by other technical societies. There is a great field for useful work in this direction, and it is considered to be one that the Mining and Metallurgical Society of America may profitably enter.

(3) The discussion of questions relating to professional practice and ethics with a view to the gradual formulation of rules for guidance, determined by the concensus of opinion in the society. Mining and metallurgical engineers are accustomed to speak of themselves as professional men, but in their sections they often show that they do not seriously regard themselves as such. This may be due to a large extent to vagueness in ideas respecting professional propriety. Consequently, it is considered that the Mining and Metallurgical Society of America will serve a useful purpose in discussing details of professional practice, such as the relation between the engineer and his clients, the matter of contingent fees, the communication of gratuitous advice. These are merely a few matters which suggest themselves. It is considered that a discussion of such questions relating to professional practice and ethics will lead eventually to the establishment of a code of ethics, developing the brief but comprehensive treatise on this subject by Sir Francis Bacon in the preface to his "Maximums of the Law" as follows: "I hold every man a debtor to his profession; from the which as men, of course, do seek to receive countenance and profit, so ought they of duty to endeavor themselves by way of amends to be a help and ornament thereunto."

(4) The discussion of questions of public policy in which the profession of mining engineering is directly concerned. There are many questions arising in connection with the Federal and States governments, which have a direct bearing upon the interests of the mining and metallurgical engineer, just as in the case of other professional men. For example, there has lately been a movement in the State of New York to compel every analytical chemist to secure a license from the State before being permitted legally to practice his profession; similarly it has been suggested that the States should pass laws requiring mining engineers to be licensed. It is no part of the present purpose to discuss or put any weight upon these particular propositions; they are mentioned merely as examples of matters of public policy which come up from time to time, affecting the profession of mining and metallurgical engineering, in connection with which the profession has heretofore had no means of expressing the consensus of its opinion. The Mining and Metallurgical Society of America will be a medium for the expression of such opinions.

(5) Finally, it is intended that the Mining and Metallurgical Society of America shall be a strictly professional society, i. e., membership in it will be limited to the ranks of the mining and metallurgical engineers, and mining geologists. Serious qualifications are prescribed as a prerequisite to membership, and it is the purpose of the founders of the society to maintain a high standard of personal character and professional ability among the membership. In pursuance of this policy, applications for membership will be subjected to rigid investigation in substantially the same way as is done by the American Society of Civil Engineers. It is hoped that this will cause the Mining and Metallurgical Society of America soon to become recognized as representative of the best in the mining and metallurgical profession of North America. Membership in the society obviously will not be an unequalified indorsement, but it will be a recognition of good standing among and by members of the profession, which in many ways will be useful. It is proposed in the list of members of the society to print brief records of their professional careers.

The society intends to publish a monthly bulletin to record its proceedings.

Smelting at Port Pirie, South Australia

According to the last semi-annual report of the Broken Hill Proprietary Company, the introduction of the "turbo" blower has given such satisfactory results, that it promises to revolutionize the smelting operations of the company, and will more than repay the first cost in a very short time. With some necessary alterations in the furnace, such as increasing the length of the water jackets and the depth of the crucibles, it is expected that as much work can be done in four furnaces as was done by seven previously. Two "turbo" blowers will be sufficient for four furnaces. In addition to the one already installed two more have been ordered, which will meet the present requirements and give one as a reserve.

Improvements have been made in the Huntington-Heberlein process by a new method of treating the material in the converters by cooling and then wetting until it contains 10 per cent. of water, the result being that less lead is volatilized. The temporary machine, capable of treating 300 tons per day, was at first experimental, but has now proved so great a success, that a permanent one is being prepared. Five further converters have been provided, making a total of 22.

Four ordinary roasting furnaces are in constant operation. These have been equipped with gas producers, replacing the ordinary fire-boxes formerly in use, and the new arrangement has proved highly satisfactory as regards economy and general convenience.

At the request of several mining companies at Broken Hill, the Proprietary company has made arrangements to purchase their products (owing to their being unable to secure reasonable terms from European buyers). Some of these companies have entered into contracts with the Proprietary company for their output for two years.

Converging guides, buffer beams, safety keps or catch beams are not used to any great extent in the headgears of the Transvaal mines.

The various grades of dynamite are made by adding more or less nitroglycerin to the absorbant.

Peter White

Peter White, of Marquette, Mich., died suddenly in Detroit, June 6, probably of heart disease. He was 79 years old and for many years had been the best known man in the Lake Superior country. He had been in it and of it from the beginning, and had taken no mean part in aiding its growth. No history of the Lake country could be written without reference to him; and a life of Peter White—fortunately an excellent one has been written and published[1]—is in effect a history of the iron country.

He was born in Rome, N. Y., and received only a rudimentary school education. When still a boy he went West, and was about 16 years old when he joined a small party starting for the Upper Peninsula of Michigan to investigate some stories of a discovery of iron there. This was the party which made the first opening of the old Jackson mine, and founded the settlement of Carp River, now the flourishing city of Marquette. Employed as a laborer, his energy and force of character early made him a leader. He carried the first mail from Marquette to St. Ignace with the aid of a dog sled, and later was the first postmaster of the new town, and agent for the iron company. He helped to open the first iron mine of a region, which now produces over 40,000,000 tons of iron ore yearly. He wrote the first bill of lading for a shipment of iron ore down the lakes—a consignment which was looked over doubtfully and refused by several blast furnaces before it found an iron worker who would use it.

At the present time, when the Lake Superior mines are generally accepted as the mainstay of the American iron and steel industry, we can hardly appreciate the toils and privations of the pioneers who began the development of those mines by opening the Jackson mine and building Carp River forge back in the '40s. They had faith and not much else, and very little backing from the outside. Their only communication with the outside world was by means of a few little schooners, poorly fitted to cope with Lake Superior storms, and these were obliged to transship all their freight at the Sault.

Peter White made his way to the front in those days, and he kept there. He was foremost in suggesting and carrying out every improvement. He built the tramway which superseded the teams and mud road which brought the first ore to the docks; later he helped to secure the construction of the old Peninsula Railroad, the first line to the Lake country. He early saw the need of a free passage at the Sault Ste. Marie, and it was largely through his influence and representations that the Congress and the Legislature of Michigan made the grants which secured the building of the first canal and locks at the Sault. He gave valuable assistance to Charles T. Harvey, the engineer who built them.

In August, 1905, when the semi-centennial of the old canal was celebrated, Peter White was the unanimous choice for historian, and made the most important speech of the day. He and Mr. Harvey, who was then still living, were the honored guests of the occasion. Mr. White was not a seeker after publicity as a rule; he was a worker and not a talker. He was for years generally acknowledged as the first citizen of the iron country; but he never sought public office, and took it only when he could aid in securing some important object. Several local offices in Marquette and some terms in the State legislature were the record of his office-holding, though his real public services were almost innumerable.

In the course of his more than 60 years of hard work, he accumulated a considerable fortune, though he was not a very rich man, as rich men are counted nowadays. He was president of the First National Bank of Marquette, a director of the Cleveland-Cliffs Iron Company, a director in other banks and iron companies, and interested in many enterprises. He was a large owner of timber lands on the Upper Peninsula. Notwithstanding his age, he was a very active man, and was on a business visit to Detroit when he died. His favorite relaxation in recent years was found in camping and hunting in the woods. Success and position made little change in his ways; he was always a plain man and was best known and appreciated by his neighbors and daily associates. His wife and one daughter died before him, and he leaves only one daughter and several grandchildren.

Few men have worked harder than Peter White did in his day, and few have had a truer success. For in the closing years of his life he was able to take the comfort and ease which he had so well earned; he was "well esteemed of all men;" and to him, more than to most men, it was given to see the fruit of his early labors.

[1] "The Honorable Peter White." By Ralph D. Williams. Pp. 208; illustrated. Cleveland, Ohio, 1905; the Penton Publishing Company.

At the Alaska United mine in 1907, one pound of chrome steel in the shoes crushed 2.39 tons ore and one pound of cast iron in the dies crushed 6.09 tons at a total cost of $0.0297 per ton for both iron and steel.

The average consumption of quicksilver per ton of ore crushed at the mill of the Alaska United mine in 1907 was 0.1301 oz. in the batteries; 0.0093 oz. on the plates; 0.004 oz. on the vanners; and 0.0346 oz. for cleaning amalgam.

Blasting gelatin is not affected by water, and freezes at a lower temperature than dynamite.

The Boston Consolidated Mill

The concentrating mill of the Boston Consolidated Mining Company, near Garfield, Utah, which is now nearing completion (it is already in partial operation) will have a capacity for treating about 3000 tons of ore per day when completed. It is interesting to make a note of the quantities of some of the material consumed in the construction of this large plant. It comprises 312 stamps, each with a dropping weight of 1500 lb.; 312 mortars weighing approximately 873,600 lb., 312 Wilfley tables weighing 2500 lb. each, and 234 Johnston tables weighing 2200 lb. each.

In the construction of the mill there were consumed 12,922 bbl. of cement (400 lb. per bbl.); approximately 2,500,000 ft. of lumber board measure; 6,078,655 lb. of structural steel and 535,939 lb. of painted, corrugated iron.

Among the power transmitting machinery were 93,600 lb. of cam-shaft pulleys; 96,681 lb. of cam-shafts; 378,745 lb. of shafting, pulleys, shaft hangers and supports; 25,895 lb. of rubber belts; 3375 lb. of leather belts for motor drives; and 13,193 lb. of Scandinavia conveyer belts.

Cleaning Copper Plates

The following method is given (*Mines and Mining*, May 22, 1908) for cleaning copper plates which are stained with verdigris: Thoroughly scrub the plates with fine sand and water, using a coarse gunny sack or scrubbing brush. Wash off the sand and then scrub thoroughly with a solution consisting of one part of sulphuric acid and four parts of water. The acid disintegrates the verdigris, dissolving the oxide of copper and leaves the plate clean, when it will readily amalgamate with the mercury without the use of cyanide solution, except when the acid solution is made stronger than herein prescribed. in which case the plate should be washed off with water, and then dressed with a solution of cyanide as usual.

The formation of verdigris on the plates can be stopped by plating them with silver amalgam, after cleaning, leaving the plates thoroughly coated with silver, whereby they become more effective for catching gold and silver, and will operate better than plates which have been electroplated with silver.

The consumption of quicksilver per ton of ore crushed at the Alaska Mexican mill in 1907 was 0.2633 oz. in the batteries; 0.0102 oz. on the plates; and 0.0106 oz. for cleaning amalgam.

An efficient safety catch, having stopped a cage or skip, should maintain it in position until it is again lifted.

Special Methods for Mining Coal in England

Modifications of Standard Plans Sometimes Suit Special Circumstances. Details of an Economical System of Pony Haulage

BY GEORGE RAYLTON DIXON

I have in previous articles described the "bord-and-pillar," and the "longwall" systems of working. These methods admit of many modifications to suit special circumstances. I call such modifications, "special methods," meaning by that, that the methods described are not general, but applied at perhaps only one colliery.

Special Method No. 1

The coal seam in this case averages about 4 ft. of clean coal. Immediately overlying the coal is a bed of fireclay averaging 8 in. in thickness. Above that again there is a thin bed of inferior coal of about 6 in. in thickness. The fireclay comes down when the seam is worked, being a very short natured stone. Any such following stone is called "ramble." When places are driven in the solid coal, the ramble in this case is too hard for the hewer to make his kirving in it. In broken working, however, when a good roof pressure is secured, the ramble is severely squeezed, and can be kirved out with ease. In broken working, the amount of pressure is far from constant, and varies from day to day. A constant face presure can be obtained when working on the longwall system. This particular seam, however, is too thick to work by the ordinary method of advancing longwall. The method applied, therefore, borrows from both the main systems of working. The coal is got in two operations, and to that extent the method is a modification of the bord-and-pillar system; the face of the second working, however, is kept in one straight line, so in this particular, the plan is a modification of longwall, and is called the "block system of longwall working." Fig. 1 shows how the seam is opened out so that a large output may be maintained. Fig. 2 shows the workings in one district only, on a larger scale.

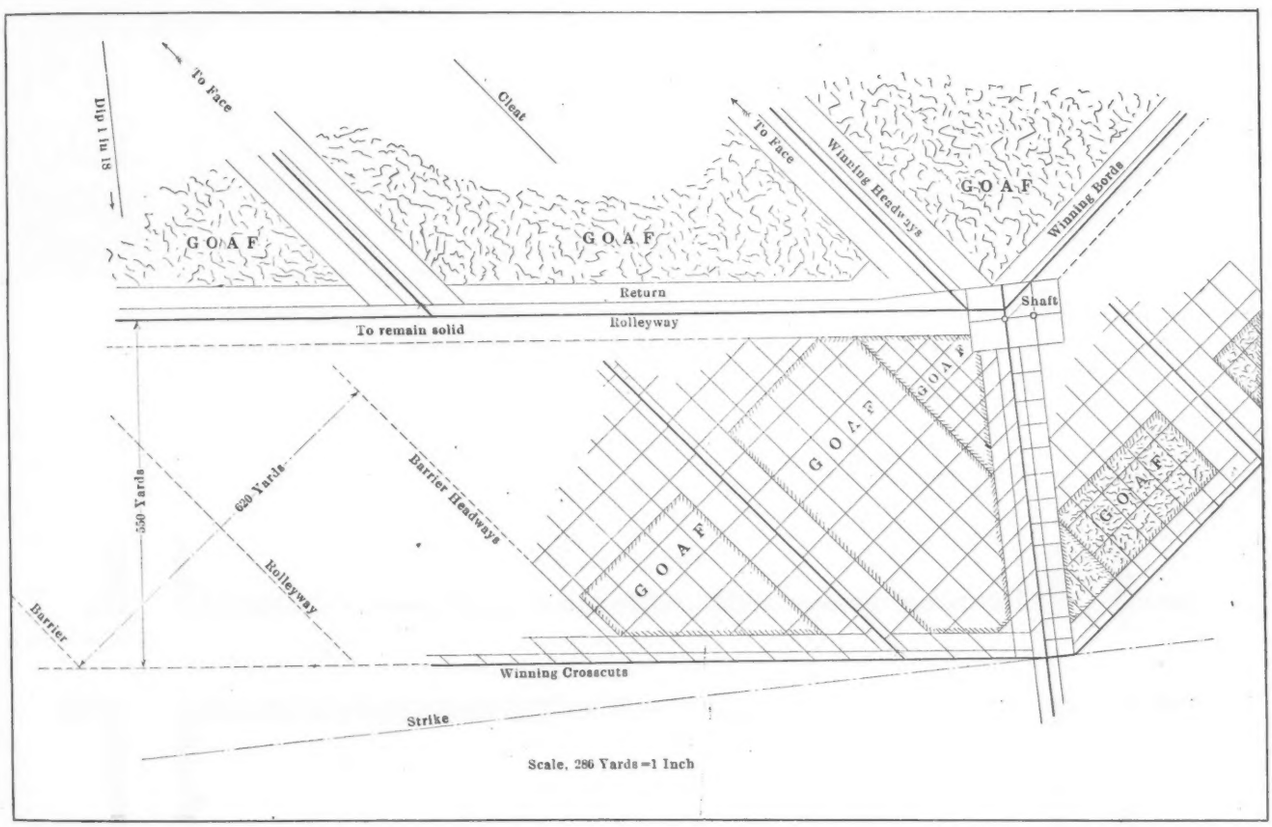


FIG. 1. METHOD OF OPENING OUT SEAM WHEN IT IS DESIRED TO MAINTAIN A LARGE OUTPUT

The Block System

Each district is opened out by driving three places in advance. These places are driven parallel with the cleavage planes in the coal or headways course. Off of them, bords are turned away 60 yd. apart. Headways are driven between the bords, 40 yd. apart. Bords are driven 12 ft. and headways 7 ft. wide. The coal is thus cut up into blocks 60 by 40 yd. A district usually has 7 pillars on each side of the winning headways.

The center one of the three winning headways serves for a main haulage road, and the other two roads act as return airways. When the pillars are being worked out, enough coal must be left to keep these roads secure. In Fig. 2, it will be seen that a pillar is left at each side. In the "whole" working, the ramble is led out of the headways, and stowed at the side of the bords. The headways being narrow, need but little timber. The method of working out the coal in the pillars is as follows: A putter's flat is formed in the first pillar away from the main haulage road, on the 4-yd. bord. A single road leads from the flat the full length of the bord, and a turn is laid off it into each headway. If we consider that the extraction of the pillars

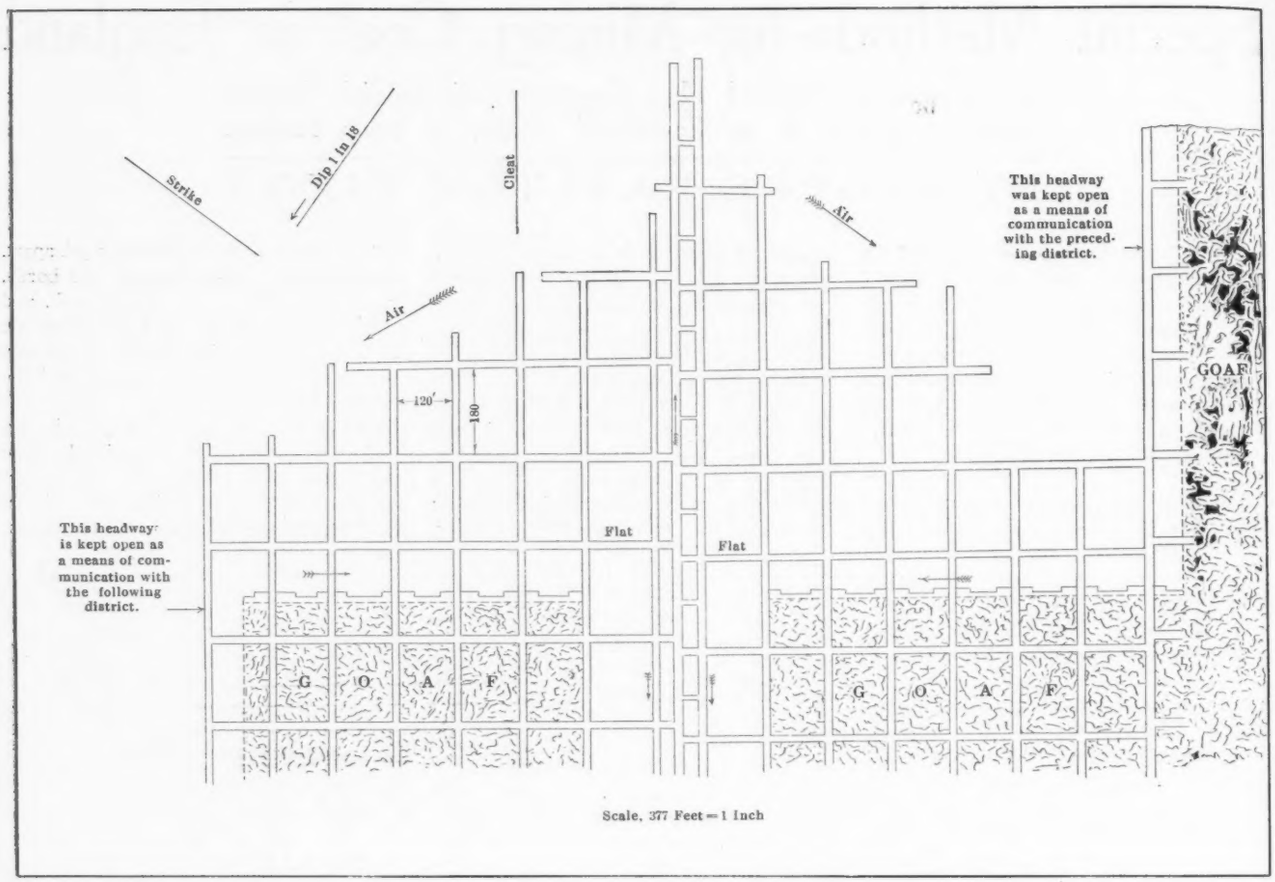


FIG. 2. SHOWS PLAN FOR ROBBING, WITH PILLARS LEFT TO PROTECT THE MAIN ROADWAYS

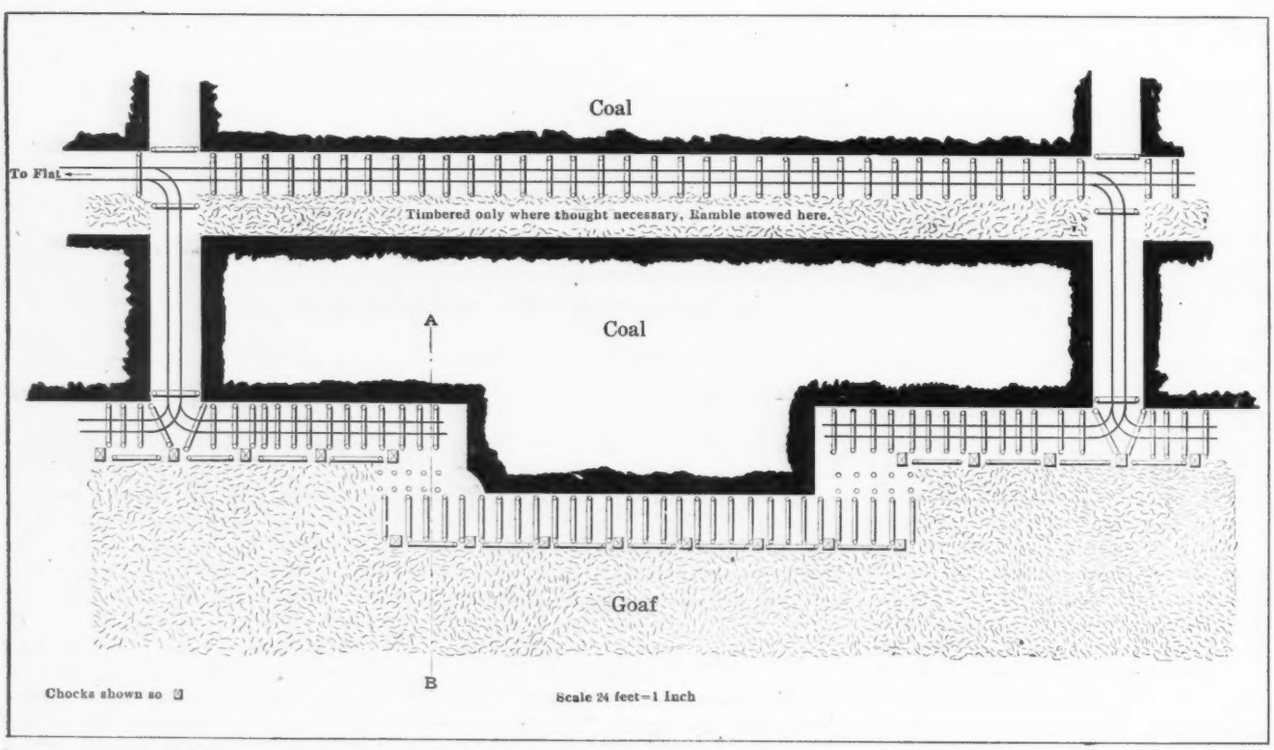


FIG. 3. DETAILS OF TIMBERING WHEN SYSTEM IS IN FULL SWING

is just commencing, the object, then, is to keep the face of the broken working in a straight line, so that the pressure along it will be as equal as possible. No part of the coal must be allowed to project back into the goaf. We must keep a road open along the face for the passage of the air current, and for general facility and safety in working. Operations are commenced at a bord, and the first thing to do is to make this bord absolutely secure. Extra props are set where the old cageway lay. At the bottom of each headway two hewers are started, one to take a lift of coal off the bottom of the pillar to the right, and the other to the left. In each pillar, therefore, two miners are working toward each other, and each has to advance 20 yd. before that lift or slice is finished. The hewers are, of course, not all equally strong and skilful, so the face is kept in good shape by having a spare place and working the men about.

It is obvious from Fig. 2 that whereas the direction of advance of the face is lying back from the vertical, as shown in Fig. 5, to get the best results. If he tries to work with the coal lying forward from the vertical, as shown in Fig. 6, the ramble will not be squeezed and the softest stratum of coal will be crushed too small. Under these circumstances, the miner will not be able to kirve out the ramble, and by his unskilful work will have defeated the whole object of the system, which, in this case, is to create conditions such that the kirving can be done in the ramble, and so save making a large proportion of small coal.

A critical time is when the face is crossing a bord. When it is within a few yards of being up, the bord above is made into the going bord. The old advancing bord is strengthened by additional timber being set. When only 2 or 3 yd. are left next the bord by a lift, on meeting at the center the hewers hole into the bord and bring the coal back, using the same tramroad.

If the roof is very bad, it may be necessary to set a row of chocks in the old bord. The presence of the ramble, thrown back by the hewers, renders the work of the chock drawers difficult and laborious. About 10 per cent. of the chocks built in are broken, but sometimes a good many good, sound chocks are lost through the rock coming away when the process of drawing is proceeding, rendering the recovering of the timber dangerous to life. It is rather confusing that the term "chock" is applied both to the individual pieces of timber 22 in. by 5 in. by 5 in., and the pieces built up into a pillar, as shown in Fig. 4.

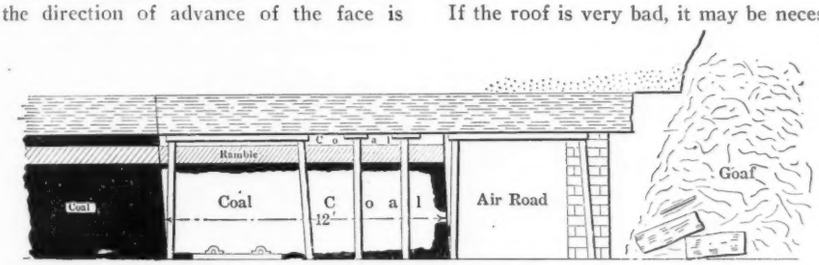


FIG. 4. METHOD OF TIMBERING ROADWAYS

the same as the direction of the cleat, each man is working in a bordway lift. As a hewer advances his lift, which is 12 ft. wide, hardwood chocks are built up. The car-road is laid alongside the coal, and is spanned by planks about 2½ ft. apart. The chocks are set as near the car-road as possible, and that is about 6 ft. from the coal. A new chock is set about every 10 ft. of advance. The space between the chocks and the old bord is thickly set with props with good lids. When the first lift is finished, all the supporting timber in the old bord, and right up to the chocks is drawn out, and the roof allowed to fall. There is then a straight face of coal, and a line of chocks carrying a projecting ledge of rock. Behind that again there is fallen rock.

The rock ledge projects as a cantilever into the goaf, and periodically breaks off, owing to its own weight. It breaks off at the chocks. In their absence it would break off at the coal. Figs. 3 and 4 show the details of timbering when the system is in full swing. As each new chock is built, in the face, one of the old row can be drawn out, but there must obviously be two chocks standing in line, just at the face of the lift. It is not until a goaf of some area is created that a good roof weight is obtained.

Lessening the Amount of Small Coal

The hewer should keep his coal face

A disadvantage is having to drive the headways in the whole such a long distance before they hole into a bord. If carbureted hydrogen is given off, it tends to collect in the ends of these headways, as they are going to the rise. The introduction of canvas brattice into all the narrow places causes a big drag on the ventilating current. It will be seen in Fig. 2 that the air current splits in the central winning, half going to the right, and half to the left, and the air passes round the whole places, and thence along the longwall face to the return airway.

Retreating Longwall

The method could be called "retreating longwall." It is longwall with the gateways in the solid coal. As I have described it, the direction of retreat is uphill. I have previously stated that a longwall face advancing to the rise is more costly than a face advancing in the direction of dip.

On referring back to Fig. 1, it will be seen that the winning headways for each district are always driven to the rise. The scheme is, that all water met with will gravitate to one point, the face of the main dip winnings. The direction of full dip in Fig. 1 is crosscut course. From the main dip winnings, crosscuts, to the rise of water level, are driven about 1650 ft. apart. The angle between these rise winnings and the headways course is such that the commencement of longwall in each district is a bit awkward. The grade

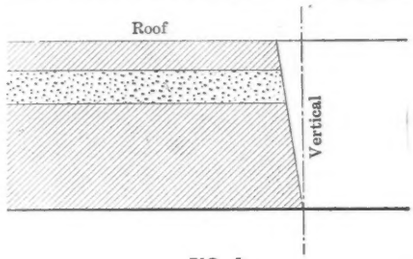


FIG. 5

MINER SHOULD KEEP HIS COAL FACE AS ABOVE

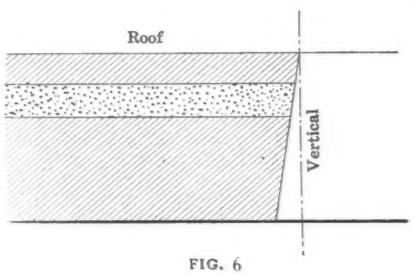


FIG. 6

COAL FACE IN POOR CONDITION

of each going bord to the right of the winnings in Fig. 2 is in favor of the load. The grade of the going bords to the left is against the pony drawing out the loaded cars.

It is obvious that with pony haulage, the system could not be applied except with a fairly light gradient. Where I saw it applied, the full dip was about 1 in 18. The rate of dip of the headways would be about 1 in 36. To those miners who are unacquainted with the process of putting coal, the sight of a smart lad, carrying out this operation in such a district, would be most pleasing.

Scheme of Haulage

A siding is made on the headway, long enough to hold two tubs. This siding is

shifted up once in the length of the headway, viz., 60 yd. The lad drives his pony down the headway; when near the points of the siding, he draws the cotter that keeps the pin of the limbers in the hole on the box of the car. He then jumps quickly off, lifting the pin out, and while the pony goes on, he pushes the two cars into the siding. He follows the pony, which will have stopped on the turn. He takes him into the dipping lift, and hauls the full car out over the turn. He stops the pony there, goes into the rising lift, and runs the full car from there against the other full car. He now couples the cars together, and orders his pony to go up the headway. He follows behind, holding onto the handle of the last car. When this car is just on the points of the siding,

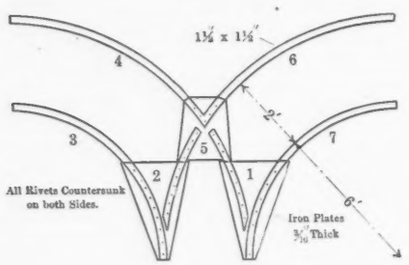


FIG. 7. A DOUBLE TURN

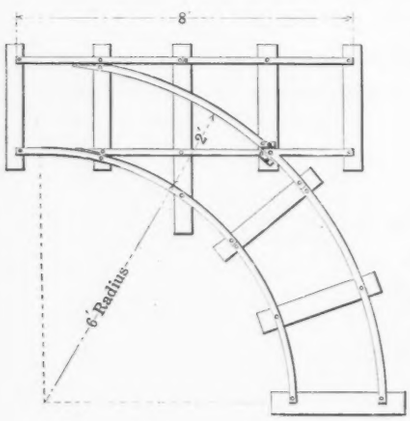


FIG. 8. A SINGLE TURN

he reaches out and catches hold of the handle on the front of the last car in the siding. By thus making a coupling chain of himself, he gets the pony to haul out the two empty cars. When they are clear of the siding points, he drops his hold of the full cars, and twists the empties onto the straight road. It should be mentioned that the points are fixed. He follows behind and puts an empty car into each lift. Then he goes after his pony which he will find waiting for him at the first flat place, so that he can stand at ease with the two full cars behind him. I have said that the smartness of some of these lads is most pleasing to see, but I must add that the sagacity of some of the pit ponies is most extraordinary.

In pony haulage when limbers are used, it is possible for the animal to hold back the cars in going down hill. When driving sets, the strain is rather severe on the first car, as it is thrown on the box and not on the drawbar. Fig. 7 shows a double turn; the several pieces are numbered. Fig. 8 shows a single turn. The points in both cases, it will be noticed, are fixed, the further getting the cars onto the right road by twisting them.

Coal in Russia

The coal production and shipments of the mines in the Donetz basin, the most important producing district in Russia, for the past year are semi-officially reported as follows, in metric tons:

	1906.	1907.	Changes.
Anthracite.....	1,654,000	1,964,800	I. 310,800
Bituminous.....	12,955,000	14,428,400	I. 1,473,400
Total mined....	14,609,000	16,393,200	I. 1,784,200
Stocks, Jan. 1....	1,027,960	852,100	D. 175,860
Total.....	15,636,960	17,245,300	I. 1,608,340
Shipments from district.....	10,121,060	12,013,820	I. 1,892,760
Local consumpt'n	4,663,800	4,549,810	D. 113,990
Total.....	14,784,860	16,563,630	I. 1,778,770
Stocks, Dec. 31....	852,100	681,670	D. 170,430

The production of coke in the district was 1,515,100 tons in 1906, and 1,701,900 in 1907; an increase of 186,100 tons. Shipments of coke were 1,183,280 tons in 1906, and 1,224,936 in 1907. Local consumption includes coal used in making coke.

Investigation of Coal-mine Accidents in Kansas

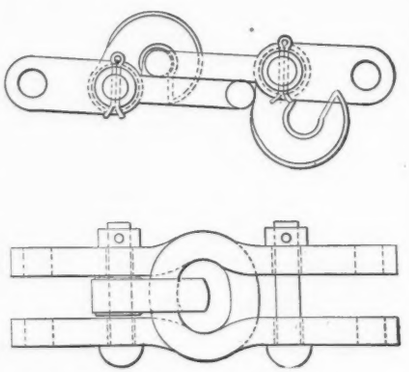
The State Geological Survey of Kansas has definitely decided to take up at once the investigation of coal-mine explosions. Two years ago considerable work was done along this line, and much important information was obtained. The Survey is desirous of receiving help from all parts of the world, and particularly asks for detailed descriptions of conditions previous to and leading up to mine explosions. The points concerning which special information is desired, are methods of blasting; amount of power used in each blast; presence of firedamp; method of sprinkling; time of year when explosion occurred; kind of powder used in blasting; and all other points of a similar nature. Although the Survey is desirous of securing information from all practical sources, however, it does not wish to interfere with or detract from investigations now in operation or in contemplation by others. All communications should be addressed to the State geologist, Lawrence, Kansas.

The miners in the Schuylkill region have started a movement to have the operators sign a 10-year agreement at the expiration of the present agreement next April.

Coal-car Couplings[1]

The car coupling illustrated in the accompanying drawing has been in use at the Minister Achenbach coal mines, near Dortmund, Germany, with satisfactory results. The advantage of the coupling lies in the fact that its two parts are interchangeable, so that either end of a car can be coupled to either end of the adjoining car.

To make a coupling, the links are brought together and the hook belonging to the lower link is dropped through the other link. To uncouple, the hook is simply lifted out of its position. Accidental uncoupling is impossible, for owing to the weight of the hook, it holds its



COUPLING FOR COAL CARS

grip in any position, and, owing to the construction of the links, the stronger the pull the tighter does the coupling hold.

This coupling should recommend itself to those coal mines at which any kind of a side dump is employed, the cars having both ends closed, since the troublesome necessity for keeping the cars ended the same way can be avoided.

Coal in the Laramie Basin, Wyoming

One of the first coal mines in Wyoming was opened by the stage company in 1865, near the old overland trail crossing Rock creek in what is now Albany county. The coal was used for blacksmithing in the vicinity of the opening and was also carried to other places for the same purpose.

Investigations made by the geologists of the U. S. Geological Survey have shown that coal beds ranging in thickness from a few inches to 6 ft. or more occur at several horizons in the shales and sandstones of the western portion of the Laramie basin, though they appear to be irregular in their distribution, in many localities giving place to carbonaceous shale or thinning out entirely.

[1] *Glückauf*, Mar. 14, 1908, p. 394.

Colliery Notes, Observations and Comments

Practical Hints Gathered from Experience and from the Study of Problems Peculiar to Bituminous and Anthracite Coal Mining

DEVELOPMENT AND MANAGEMENT

The quantity of water used for sprinkling the dust in rooms and headings should be approximately one-half the weight of the dust present.

The number of deaths in English coal mines during 1907 was, 1239, an increase of 97 over the previous year. The deaths from falls of roof or side numbered 572 as compared with 547 in 1906.

Economy of boiler fuel is an impossibility with a poorly designed grate. Grates should be of such design as can be quickly replaced in case of accident and should be so constructed that the heat will not warp or crack them. A grate should have at least 50 per cent. of air space between the bars.

Coal is found in the province of Mendoza in Argentine. Practically nothing has been done to develop this field, and such openings as have been made are entirely superficial. Some of the Argentine product resembles English coal in its fuel value. None of the seams so far discovered has produced a coking coal.

When sinking a shaft by the freezing method, work should commence as soon as the frozen wall is complete, in order that the central part of the shaft may be in a soft condition for excavating. Owing to the intense cold, water put into the drill holes quickly freezes, causing the drills to stick fast, therefore, brine or a freezing mixture should be used.

The $50,000 appropriated by the Fifty-eighth Congress for the determination of the character and extent of the coal deposits in Indian Territory in the segregated lands of the Five Civilized Tribes is now being expended. The extent of the coal is being tested by diamond drill holes. It is expected that the work will continue for about one and a half years.

It has been suggested that the use of the chain type of coal-cutting machine be prohibited in extremely dusty mines as it produces a great quantity of fine dust which is a menace to the safety of the mine. It also necessitates the use of too large a charge of explosive to break down the coal, as this type of machine gives a very low undercutting. The larger the charge in a dusty mine the greater the danger of an explosion.

Experiments have proved that a mixture of firedamp and air just below the explosive point becomes explosive when suddenly compressed, as by the discharge of a heavy shot, a sudden and extensive fall of roof, or a heavy explosion in nearby workings. To this end, in all European mining countries, regulations have been made forbidding the use of such explosives as are known to be liable to ignite firedamp, and limiting the amount used in a single charge.

The results of tests made by the University of Illinois to determine the weathering qualities of coal show that: (1) Submerged coal does not lose appreciably in heat value. (2) Outdoor exposure of coal results in a loss of heating value varying from 2 to 10 per cent. (3) Dry storage has no advantage over storage in the open except with high sulphur coals, where the disintegrating effect of sulphur in the process of oxidation facilitates the escape of hydrocarbons or the oxidation of the same. (4) In most cases, the losses in storage appear to be practically complete at the end of five months. From the seventh to the ninth month the loss is inappreciable.

One of the most effective methods of preventing coal-dust explosions is to divide the ventilating current into as many splits as the volume of air will permit without endangering the amount of air required by law for each working place. All intake air currents, if the outside air is cooler than the mine air, should move slowly and the airways should be well supplied with moisture. Where gas alone is to be dealt with, few splits and high-velocity air currents give the best results, but where dust explosions are the principal danger to be guarded against, this method of ventilation rapidly dries out the mine unless all intake airways are frequently and thoroughly watered.

Steel-band driving belts are used to some extent in Germany. They are narrower than the equivalent leather belts, and can be used successfully on short spacing of driver and driven-pulley; they can also be run at a higher speed, and have no stretch. The band of steel is butt-jointed with a short inside and a long outside splice plate, joined through the band with a single row of screws or rivets on each side of the joint. The inner splice-plate is curved to the radius of the smaller pulley. The long ends of the outer splice-plate flare away from the band slightly serving as guards to prevent any sharp bending at the joint. The pulleys for these steel belts may be smooth or covered with special friction covering.

In mines where drainage is necessary above the level of the main sump, and where ridges hold the water back from this sump, some other system of drainage must be installed. Where ditching is impossible, and where hauling or pumping is undesirable, siphons give good results. The water is collected in a local sump situated in the lowest portion of the district to be drained, a siphon is installed and the water of the local sump is forced by atmospheric pressure to the top of the ridge from whence it descends by the force of gravity into the main sump. This method can only be used where the vertical distance from the water level in the local sump to the top of the ridge is not greater than that distance to which the atmospheric pressure is capable of forcing the water.

Modern horizontal by-product coke ovens are constructed for producing coal quickly; they are therefore made narrow, generally from 16 to 22 in. wide, and heated from both sides so that thick crusts of coke are never formed as in beehive ovens. Coking proceeds from both sides and the escaping gases do not penetrate the mass of incandescent coke, so that only a small amount of the heavy hydrocarbons are deposited, the remainder being carried away by the gases. Coals containing large amounts of oxygen and hydrogen cannot be coked in the modern by-product horizontal oven because the combination of the above mentioned gases causes the formation of steam at the coking temperature and abstracts so much heat from the oven that no coherent coke is formed. Such coals to coke successfully must be submitted to a considerable pressure during the coking period.

It has been shown that the use of very large mine props is not as economical nor any safer than the use of smaller timbers. This is especially true where timbering is used in swelling ground. Smaller timbers and contemporaneous flushing give the best results. Hewn timber is stronger than sawed timbering. The life of mine timbering depends to a great degree upon its seasoning and the time of the year at which it is cut. Well seasoned timber will outlast unseasoned wood except in wet places. Timber that has grown too rapidly should not be used for mine supports, as its fibers will be soft and spongy. Timber which grows on northern slopes is softer, less firm, and will not last as long as that grown on slopes with a southern exposure. While warm, moist, impure air affects timbers quickly, carbon dioxide gas has little effect on them; however, the impure gases generated by decaying timber quickly attack sound timbers.

Metallics

Alloys of nickel and tin, containing 40 per cent. or less of tin, are magnetic; those containing more than 40 per cent. tin are not magnetic.

On the basis of spelter at £23 the Broken Hill Proprietary Company realized a profit of 22s. per ton on zinc concentrates assaying 42 per cent. zinc, 10½ per cent. lead, and 17 oz. silver per ton.

The addition of 2 per cent. of calcium chloride to a cement concrete will prevent its freezing while setting during cold weather without impairing its strength. More of the salt weakens the concrete.

At the lead-smelting works at Pertusola, Italy, the furnaces deliver 500 cubic meters of gas per minute, which is filtered through a cloth surface of 40 to 54 square meters, an area that has been found to be amply sufficient.

The cost of water to the Broken Hill Proprietary Company is 5s. per 1000 gal., which is a great tax on mining operations, but a new scheme is being executed which is expected to furnish water at a cost not to exceed 2s. 6d. per 1000 gal.

The Laschinsky electrolytic method of copper recovery from its ore is used at Boleslav, Russia. The special feature of the process is to prevent oxidation of iron at the anodes, and consequent waste of current, by coating the anodes with lead.

If it takes $10,000 in equipment, etc., to turn out five tons of gray-iron castings daily, it would take $40,000 to produce the same tonnage in malleable castings. By good practice, however, the same plant could be forced up to a production of 15 tons daily.

A certain foundry was producing about 90 lb. per man per day on the average, and the castings were costing 3½c. per lb. The introduction of improved methods increased the output per man to 250 lb., and 2¼c. a lb. represented the cost of the castings.

In converting 42 per cent. copper matte, one ton of copper requires one ton of silicious lining (ore with 80 per cent. SiO_2); one ton of copper makes 2.5 tons of converter slag; the by-products amount to one ton per ton of copper; these are average results covering several periods at different plants.

Spirits of camphor is said to be one of the best liquid erasers for removing Higgins' ink from tracing cloth. The only precautions necessary in using it are to place a piece of blotting paper under the tracing at place of erasure and not to rub too hard. Apply with a small sponge or a piece of clean cloth.

In copper converting it is now the practice to help the converter lining by charging coarse silicious ore by a boat, handled by the crane. The reason for doing this is because it is easier and cheaper to provide silica by this method than to reline shells. In Utah the ore usually employed comes from Nevada, and contains about 80 per cent. SiO_2. The ore is crushed to pass a ⅝-inch screen.

The demand for large crucible-quality ingots is increasing day by day; many ingots are required for various purposes several tons in weight and the crucible steelmaker is confronted with really practical difficulties in making these large ingots, taking into consideration the number of pots to be teemed, and the possible variation in quality. The induction furnace solves this problem, for it is as easy to make a two-ton charge in such a furnace as a 90-lb. charge in a crucible.

Since the Broken Hill Proprietary Company has put in operation its zinc concentration plant, it has sold for delivery to the end of 1909 zinc concentrates to the amount of 326,230 tons, containing approximately 130,492 tons of zinc. Up to the end of May, 1907, 131,967 tons of concentrates, containing approximately 52,782 tons of zinc, had been delivered. Payment is made at the time of delivery by buyers on *pro forma* invoice, but the actual price is fixed at the average for spelter during the year following that of delivery.

The Gorbov and Mitkievitch arc furnace for the fixation of atmospheric nitrogen is about to be worked in Russia on a technical scale. In this the current of air draws the arc (the voltage across which is 600-1500, direct or alternating) into a worm, in whose mouth is formed a "bunch of fire" through which all the air has to pass. The products of combustion are subsequently cooled in the farther part of the worm. In an experimental 14-kw. furnace an output of 56 grams HNO_3 per kw.-hour has been attained. The furnace is stated to be simpler and more economical than the Birkeland-Eyde furnace.

Alterations to the zinc-concentration plant (Delprat process) of the Broken Hill Proprietary Company, made during the semester ending May 31, 1907, included deepening of the pans in which the flotation is effected. As a result of this, an improved concentrate has been obtained, the average grade for the six months having been 41.81 per cent. zinc, as against 40.66 per cent. for the previous period, while during the last few weeks the grade was over 43 per cent. During the six months in question, 25,353 tons of zinc concentrate were obtained from the treatment of 116,240 tons of tailings from the dressing works and old dumps.

In making crucible steel, the furnace which generates the greatest amount of heat under exact control will give the best results. Perfect heat control is obtained with the induction furnace by simple methods of varying the primary current and thus controlling the current flowing in the crucible. Therefore the induction furnace is perfectly adapted for the production of the finest grades of this kind of steel. There is no possibility of the metal becoming contaminated from the electrodes, and no gases are in contact with the metal. In addition to these purely technical advantages, there is also the important one of economy, through being able to dispense with the costly crucible.

At the end of November, 1906, the ore reserves of the Broken Hill Proprietary mine were estimated at 3,000,000 tons. During the next six months 290,000 tons were extracted, but at the end of May the ore reserves were estimated at 2,955,000 tons. At the end of November, the estimated reserves were 2,643,000 tons, or two years' full output if no further discoveries occur, after which the production will probably diminish gradually, but similar remarks were made in 1904, and history may repeat itself. With increased depth the ore is becoming denser and harder and more expensive to work. The Delprat shaft is now 1302 ft. deep, the Blind shaft 1345 ft., and the Stewart shaft 1212 feet.

The Zinc Corporation reports that the Elmore vacuum process just installed at Broken Hill is now running experimentally, treating material from the Block 10 dumps. In the first run 3800 tons of tailings were treated, producing 1210 tons of zinc concentrate, assaying 44 per cent. zinc, 6.5 per cent. lead, and 13 oz. silver per ton; and 48 tons of lead concentrate, assaying 60 per cent. lead, 36.5 oz. silver, and 13 per cent. zinc. The tailings treated assayed 16 per cent. zinc, 4 per cent. lead and 7 oz. silver. The tailings from the Elmore process assayed 6.5 per cent. zinc, 1.5 per cent. lead and 3 oz. silver. The plant installed is of 500 tons capacity per day, arranged in 16 units, of which eight are now in operation.

The 2500-ton mill erected by the Federal Lead Company, at its Central mine, Flat River, Mo., is said to have cost about $1,250,000. This corresponds to about $1.67 per ton of annual capacity. The mill of the National Lead Company at the same place, erected in 1900, cost about $300,000, which would be $1 per ton of annual capacity on its nominal rating of 1000 tons per day. However, this mill actually treated as high as 1200 tons per day. The National mill is of steel construction and is a good example of modern design in all respects. The mill of the Columbia Lead Company, erected at about the same time, cost about $45,000, which would be 60c. per ton of annual capacity on the nominal rating of 250 tons per day, but this mill frequently attained 300 tons. The Columbia mill is of timber construction and is an example of the older design of dressing works, such as is to be found in the Cœur d'Alene and elsewhere.

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The Steel Situation

The recent reduction in the price of steel bars, which was forced by the action of the outside makers, has been followed this week by a cut in the quotations for other steel products. This had been generally expected, though it was known that the heads of the Steel Corporation were strongly opposed to any such action. The pressure of the large outside interests, however, has proved too strong, and the general reduction has been ordered. It applies to all finished products except steel rails, and in that case it is explained that the increased cost of manufacture required by the strict specifications recently adopted by the railroads, corresponds in fact to a reduction in price. It is also intimated that there will be somewhat lower prices for Lake iron ore.

That the reduction had to come was a foregone conclusion. It was so plainly evident that the Steel Corporation would have to recede from its position that the placing of new orders, moderate enough in recent weeks, had practically ceased. The buyers of billets and finished steel were out of the market altogether for the time and would do nothing until some adjustment was reached. Projects for construction of all kinds were held back, and the reserves of idle money—much of which is ready for investment, if it can be shown that the advantages of cheaper material and lower costs could be obtained—continued to be held by the banks and trust companies.

The influence of the Steel Corporation, while it could not prevent the present movement, was sufficient to limit its proportions. It is extremely unfortunate that the reductions now offered are of a grudging and half-hearted sort. For the most part they amount only to 10 per cent., or even less, and this will not meet the demands of consumers, who will claim with reason that the demands of the situation have not been met. Plates and structural steel—the lines in which new business can be most easily secured—are cut only $2 per ton. In nails, the line in which the ordinary consumer meets the maker most closely and widely, the drop is only 5 per cent. In billets the reduction from $28 to $25 still leaves a spread of over $9 between the price of bessemer pig and billets, which seems far too large a margin. The maintenance of the price of rails will not tend to bring out the railroad orders which have been so notably lacking. Moreover, the railroads will not be comforted by the report that the Steel Corporation has taken orders for 1,750,000 tons of steel rails for foreign delivery. These orders are taken in competition with foreign mills, and at current prices in Europe they can hardly net the maker over $21 per ton at mill, or only 75 per cent. of the price the home consumer has to pay.

It is to be feared that the present action will not stimulate business to any great extent. It is not radical enough to bring the backward buyer into the market; but the fact that some concessions have been made is enough to encourage the belief that more may be secured by insistent demands. It is quite possible that the deadlock on new business will continue for a time. The steelmakers have ignored the lessons they might have learned in 1894 and 1904. The belief that combination can overrule the law of supply and demand seems to be still strong in the minds of the leaders of the trade. Previous periods of depression have shown the futility of that belief, and the course of the copper trade at several such periods has emphasized it; but further teaching seems to be needed.

It is possible, even probable, that the large independent companies may break away from the present combination. They must realize the position, and must be strongly tempted to take the advantage which it is within their power to realize.

Gold Production in 1907

At the time the preliminary review of the gold production of the world was published in the JOURNAL of Jan. 4 last, it appeared probable that the total output of 1907 would be about the same as in 1906, or might possibly show a small decrease. The corrected figures since received show that there was actually a gain in 1907, as compared with the previous year, though the increase was smaller than for several years. In 1905 the total reported was $378,411,754; in 1906 it was $405,060,969, an increase of $26,649,215 over 1905. For 1907 the corrected figures show a total of $412,556,136, an increase of $7,495,167, or 1.8 per cent., over 1906; and of $34,144,382, or 9 per cent., over 1905. The chief reasons for the difference between the January estimate and the

total now given were the inclusion of a large amount of reserved gold in the December statement of the Transvaal, bringing up the year's total to a higher point than had been anticipated; and an unexpected increase in the Russian output.

Of the four chief producing countries—which together furnished last year 78 per cent. of the world's production—two increased their output, while two experienced a decrease. The Transvaal advanced from $119,609,373 in 1906 to $133,352,381 in 1907; and Russia from $22,469,432 in 1906 to $26,518,253 last year; gains of 11.5 and 18 per cent., respectively. On the other hand, the output of the United States fell from $94,373,800 in 1906 to $89,198,711 in 1907, and that of Australasia from $82,358,207 in 1906 to $75,849,348 in 1907; the losses, respectively, being 5.5 and 7.9 per cent.

Among the minor countries there were no important changes. Mexico had a moderate gain and Canada a considerable loss, chiefly in the Yukon. British India lost slightly and Rhodesia had a considerable gain. Among these producers of the second rank the increases and decreases nearly balanced; but it is not possible to go into all the changes in detail within the limits of this article.

The great gain in gold production in the last decade has been due to two causes; the discovery of new producing regions, as in the Yukon and Alaska and in Nevada; the improvement in mining and metallurgical processes, increasing the saving of gold and making possible the reopening of old mines and the working of new ones which would have been unprofitable under former conditions. In 1907 there was no change in either of these conditions. No new gold producing districts of large importance were discovered or opened; and no great improvements in the saving of gold were introduced, though minor advances are, of course, constantly being made. While it is not possible to make a division with any approach to accuracy, it seems probable that last year—outside of the Transvaal—there was a larger increase in placer gold than in that from deep mines; and much of this was due to the gold dredges which have supplied a method of working gold-bearing gravels that formerly were unavailable.

An unusually large proportion of the gold production of 1907 undoubtedly passed into immediate use as money in circulation and in bank reserves against credit. This was one of the results of the great business activity throughout the commercial world for several years past. The United States secured its full share, or rather more, having added to its production of $89,198,711 net imports amounting to $88,182,385. The total addition to its gold stocks was therefore $177,381,096, or 43 per cent. of the world's production. Even this ability to attract from abroad gold nearly equal in amount to its own production did not save the country from a serious monetary crisis.

New Mining Legislation in Mexico

Americans who are engaged in mining in Mexico are greatly exercised respecting a new law that it is proposed to enact in that Republic prohibiting foreign companies from denouncing or holding mining properties in Mexico, and seriously limiting the rights of individuals. The provisions which excite alarm are the following:

"Art. 141.—No title deed for mining property can be issued to foreigners denouncing properties within the bounds of border states, if they do not previously obtain a special permission from the executive of the Union. This requirement will also be exacted when the denouncement is made conjointly by foreigners and Mexicans. If the permission is refused, the ground shall be declared free and the same effects as those consequent on voluntary abandonment of a denouncement, as set forth in article 36, will follow.

"Art. 142.—The permission mentioned in the foregoing article will also be necessary in order that foreigners may through any other process come into possession of mining properties or liens thereon in any of the border states or territories."

"Art. 144.—Foreign corporate bodies are incapable of denouncing and acquiring henceforth, by any process, either mining properties or liens thereon, within the territory of the Mexican Republic."

We have not yet been informed as to the motives inspiring such a departure from the liberal policy that has heretofore characterized the Mexican government, but a law of this nature would obviously be so inimical to the best interests of the Republic that we find it hard to believe that it will be enacted.

The Mackay Mining Building

By the time this copy of the JOURNAL is in the hands of its readers, the Mackay Mining building at the University of Nevada, at Reno, will have been dedicated. The building and equipment represent the expenditure of about $120,000, the greater part of which sum was presented by Clarence Mackay. Moreover, Mr. Mackay has completely improved the quadrangle of the University at an expense of $35,000. A bronze statue of John William Mackay, commemorating the Comstock days, is to be presented to the State of Nevada.

It is pleasent to note the gifts that Mr. Hearst and Mr. Mackay, sons of fathers who figured prominently in the early development of the mineral resources west of the Rocky mountains, have made for the promotion of education in the mining industry from which their own fortunes were derived. The names of Hearst and Mackay are indissolubly connected with the romantic and spectacular history of early mining in the West, in the days when the discoveries of great bonanzas inspired prospectors to roam all over the great barren country, and it is good to have these monuments to the successful pioneers.

The entire mining industry will feel a warm appreciation of the great kindness of Clarence Mackay toward the State of Nevada, and in particular to the school of mining at the University of Nevada, which, through his generosity, has made an advance that otherwise 10 years could hardly represent.

THE BILL FOR THE creation of a bureau of mines, which was passed by the House of Representatives at the session just closed, was considered by the Senate Committee on Mines and Mining, and reported to the Senate with certain amendments. The Senate did not take any action on the bill, but it is likely to be called up at an early date, when Congress reconvenes in December next.

THE CANADIAN Mining Institute has planned a series of summer excursions, which will include visits to Nova Scotia and Quebec; to Cobalt and Sudbury in Ontario, and to British Columbia. Invitations sent to British engineers through their associations have met with many responses, so that a number of Englishmen, as well as Canadians, will join in studying the mineral industry of the Dominion.

Views, Suggestions and Experiences of Readers

Comments on Questions Arising in Technical Practice or Suggested by Articles in the Journal, and Inquiries for Information

CORRESPONDENCE AND DISCUSSION

Metallurgy and Mining in Fiction

We are all indebted to Robert Barr for his stories often dealing with the modern phase of American life. With these and others no doubt many readers of the JOURNAL are familiar. He is at present, in one of the popular English monthly magazines giving his readers a picture in fiction of modern mine promoting, financing and other things in London. These stories are interesting, but a bit staggering in parts.

The story now running deals with a mine on the west coast of Africa called the Red Shallows, "Red" as is explained because of the color of the gold and "Shallows" because the ore lies on the surface. It is the character of this ore that puzzles us mining people. Despite the apparent visible richness of the ore about 100 desperados from all parts of the world are sent to mine it by blasting and quarrying, and to load it into a steamer. They seem to do this quite contentedly for a fixed wage and apparently show no troublesome tendencies toward "high grading." They might perhaps be useful in Goldfield, Nevada.

We comfort ourselves with the thought that it may be an ore containing very fine gold, but later on this assumption becomes untenable. Our hero having obtained a shipload of ore lands it at a coast village in Cornwall, and Cornishmen, who, I believe, think they know something about ores, will be disappointed to learn that it is carted to a copper mine without its true value being suspected. This copper mine has been running a furnace (which we hope will be patented soon) that produces bar (blister?) copper in one operation from Cornish copper ores. This copper furnace is blown out and the gold ore put in instead and—lo and behold!—solid gold bars weighing 100 lb. each are at once tapped and cast from this furnace. Can you do better than that in America?

The final insult to the intelligence of Cornishmen is given, however, when it is explained that the six smelters who are sufficient to run this wonderful furnace are "ignorant men" who would notice no difference in the color of the metal produced. I advise Mr. Barr to keep away from the Cairn Brae district. I leave it to the ingenuity of readers of the JOURNAL to guess what was the ore, and hope they will be able to go one better than this in ore treatment.

Mr. Barr's picture of an English mining engineer is not flattering. Mackellar, the young engineer, is rough and uncouth and is totally unacquainted with the uses of a dress suit or dinner jacket. He shows a most surprising ignorance of all matters outside those which he thinks belong to his profession; certainly he is a wonderful metallurgist. I have been wondering if by any chance Mr. Barr had been drawing from life. Could he have drawn his picture from a Royal School of Mines man? Horrible thought!

E. M. WESTON.

Brakpan, Transvaal, April 20, 1908.

Gold Dredging Practice in California

There are several inaccuracies in the article by Robert Sibley in the JOURNAL of May 30. Among others, the arrangement of two types of gold dredge is shown in the accompanying sketches. The sketches show the one type of dredge of two different makes and not the two types. The article then speaks of a water-tight hull built of 4-in. timbers. The lightest and smallest hulls are made of 8x8-in., 10x10-in., and as large as 12x16-in., only the skin being made of 4-in. stuff.

The quotation from L. J. Hohl is taken from the report of the California State Mining Bureau, published in 1905 and is much out of date. Mr. Sibley, who professes to treat of dredging in California starts in with the equipment of a dredge and gives, "Detailed specifications submitted by manufacturers giving a fair idea of the practice in Oroville," and then proceeds to copy, word for word, a set of Bucyrus specifications drawn for the Three Friends dredge, built at Nome, four or five years ago, and of the steam-driven type, whereas all the dredges in Oroville are electric and the modern dredge of today bears little relation to these specifications of five years ago.

Mr. Sibley criticizes the El Oro No. 2 as being too massive and somewhat extreme as far as the size of motors is concerned. This boat, in operation, has proved very successful, and I believe I am safe in saying that no dredge has ever yet been built too heavy for the work at hand in Oroville. This particular boat is digging in some of the hardest ground in that district, and having recently spent a great deal of time on this boat, I consider it one of the best designed boats in the section, notwithstanding the fact that it was built by competitors.

Under the description, "Construction of the Hull," Mr. Sibley goes on to state that "the posts are driven into the ground until they project 4 ft. above the bottom of the pond." This is never done as the posts, if driven into the ground, would always remain there and would be a serious menace, not only to the operation of the dredge, but to the safety of the hull; therefore, the posts are only placed on a footing board.

Another inaccuracy mentioned under the heading, "Installing Machinery" is the fact that the Marion Steam Shovel Company is placed in Milwaukee, Wis., instead of Marion, Ohio. Under "Prospecting Dredging Ground" Mr. Sibley describes erors in sampling frequently occurring from the material squeezing in around the bottom of the casing, whereas most of the errors occur from the other operation, i.e., material squeezing out; further on he states that the material is pumped and weighed in order to check up. This is never done in drilling practice.

Under "Question of Design," he states "the square tumbler gives the better speed relation." The many-sided tumbler gives far better speed relation, as a higher speed can be maintained owing to the more numerous faces and consequent less jar in the buckets seating on a tumbler. Again, he states the 5-cu.ft. dredge has been thoroughly worked out and the 7-cu.ft. is experimental, hence the 5-cu.ft. bucket is advisable. Most of the dredges under construction in California at present range from 7 to 13 cu.ft. and the 7-cu.ft. bucket has been in use for the last eight years.

Next, under "Problems in Operation," he states that the steel gantry is generally considered to be far superior to the wooden structure. The steel gantries have only been built by the Risdon company and nobody else in American has ever deemed them worthy of consideration, and results have proved this to be true.

At the bottom of page 1087 Mr. Sibley states that belt conveyers do not work effectively at a higher grade than 18 or 20 per cent.; whereas they are commonly built on 15 or 20 deg., and sometimes as high as 25 deg., which is twice the inclination that Mr. Sibley states.

At the last of the article, page 1088, referring to sand pumps, he says they are usually employed to suck this sand up and throw it over the tailings pile. Sand pumps are rarely ever used now excepting in starting the boat and in enlarging the pond in its first operations. He further says that on boats using head-lines, instead of spuds, no sand pump is required,

for the stern of the hull is beveled. This has no relation whatever to the use of sand pumps. However, most of the head-line boats which happen to be of the old Risdon type are equipped with sand pumps, and the reason that the head-line boat does not require the sand pump as much as the spud boat, is not owing to the shape of the stern, but owing to the fact that it is handled differently, the center being on the head-line a few hundred feet ahead of the boat, whereas with the spud the center of swing is at the spud at the stern end. M. E. V.

Philadelphia, May 29, 1908.

Machine Drills for Stoping

We are tempted occasionally to reply to articles giving misinformation which appear from time to time in the various technical journals, but usually press of other matters prevents. However, our attention has been called to two statements in particular in an article by E. M. Weston in the JOURNAL of May 16 on, "Machine Drills for Stoping," to which we take exception and which should not be allowed to pass without a reply.

Being pioneers in the introduction, manufacture and sale of air-hammer drills, it may be assumed that we know something about their efficiencies compared with those of the piston type; and it may also be assumed that it has been necessary for us to keep in touch with the improvements made and the results obtained by other manufacturers of these small stoping drills, and that we speak from positive knowledge. We venture to say that there is not a small stoping drill made of 1½-in. cylinder diameter or larger, at least in Denver, which will not outdrill, by a considerable margin, any 2¼-in. piston drill, bottoming with the same diameter of hole and not including the time of setting up; and we believe that manufacturers of air-feed stoping drills who are also manufacturers of 2¼-in. piston machines are themselves thoroughly convinced of this fact.

Another statement made by Mr. Weston is, in effect, that the superior drilling efficiency of the water Leyner drill is due to the introduction of water at the cutting point of the drill bit. As a matter of fact, the water retards the drilling rather than increases it, for the water Leyner will drill about 20 per cent. faster without the use of water than with it, but naturally with hollow steel the dust would be unbearable. The water supply serves to lay the dust and form a sludge which is ejected from the hole by means of the air which is mingled with the water in passing through the drill steel.

We might enter into a long scientific discussion of the reasons for this if time and space would permit, but will simply suggest the reason by stating that it might be compared to cutting glass under water. J. A. FARWELL,

Secretary-treasurer, The J. Geo. Leyner Engineering Works Company.

Littleton, Colo., May 19, 1908.

Questions and Answers

Inquiries for information are answered in this department as promptly as possible, but more or less delay is often unavoidable. Many inquiries involve a good deal of investigation and these can be answered only when the general interest in the subject is conceived to justify the expenditure of the time required. Correspondents should refrain from asking for advice that ought to be obtained by professional consultation with an engineer. We will not answer questions pertaining to the value of specific mining enterprises. Inquiries should be framed concisely.

THE DEEPEST SHAFT

Having a discussion recently with another engineer as to which is the deepest shaft and what are the deepest mine workings, i.e., the greatest depth vertically below the surface, whether reached by a shaft, incline, or adit level, I shall be obliged if the JOURNAL will answer these inquiries. Am I right in supposing that the Red Jacket shaft of the Calumet & Hecla is now over 5000 ft. vertically below the collar of the shaft, and that this shaft is at the present time deeper than any shaft in any country? Is any of the German collieries opened to a greater depth than 5000 ft?

Cordova, Spain. J. H. FENNELL.

March 23, 1908.

So far as we are aware, the No. 3 shaft of the Tamarack is the deepest. Its depth at the end of 1905 was 5139 ft. No. 5 shaft of the same mine was 5086 ft. and the Red Jacket shaft of the Calumet & Hecla was 4920 ft. deep at that time. We are unaware of any incline, or adit level which attains a depth below the surface so great as that of the above mentioned shafts. The deepest colliery in Europe, so far as we know, is Pit No. 18, Charbonnage des Produits, at Flénu, Belgium, which in 1905 had attained a depth of 3773 feet.

ANTHRACITE COAL FOR COPPER SMELTING

What information is available respecting the use of anthracite coal in copper smelting? The conditions at a mine in Peru make it difficult and expensive to bring coke into the region, for it has to be transported on mule back. A good grade of anthracite coal is produced in the immediate vicinity of the mine.

New York, April 15, 1908. W. A. D.

The following is reprinted from the JOURNAL of Dec. 1, 1906:

So far as we are aware, copper smelting was never done with stone coal in Arizona, but the refinery slags at Lake Superior have been smelted with anthracite for many years. The old Revere Copper Company, at Point Shirley, near Boston, used to smelt roasted-copper ore in low-blast furnaces (5 ft. high), with anthracite, the furnaces being brick-lined. They used about 13 per cent. of fuel (figured on the charge), or 20 per cent. (figured on the ore). The furnaces being so low were, of course, wasteful of fuel. There was no special trouble in the smelting, but it was found difficult to train men accustomed to coke to the use of anthracite, the furnace acting quite differently, the heat being more concentrated with anthracite, and the furnace producing more and poorer matte than with coke.

IDENTIFICATION OF DIAMONDS IN THE ROUGH

Will you please give some simple method for the identification of diamonds in the rough. Probably not one miner of a very large number would recognize this precious stone if he found it, and the recommendation of some practical tests would be useful.

H. L. S.

Clinton, S. C., March 25, 1908.

There is a simple and infallible test for the identification of the diamond. It is the hardest of all stones. Among the natural stones corundum ranks next, but carborundum (an artificial product) stands between corundum and the diamond. Therefore, obtain a crystal of carborundum or corundum. If the stone suspected to be a diamond will scratch either of them, its identity as a diamond will be well established.

BRANGLE-BRANGLED

In a recent visit to the Wisconsin zinc region I heard a mining term that was new to me. The ground between two series of "flats and pitches," containing some disseminated ore, is called the "brangle." What is the origin of that word?

W. T. C.

It is a common term in British mining. Thus a mine report may read: "The drift shows a vein 16 ft. wide, composed of high-grade fluorspar, brangled with ore," which is equivalent to say "speckled" with ore. We do not know what is the origin of "brangle." Probably it was introduced in Wisconsin by the Cornish miners who settled in large numbers in the zinc-lead district about the middle of the last century.

According to a recent consular report, there were 110,915 tons of bauxite, valued at $471,113, exported from France in 1907.

A consular report states that on account of the increasing export of bauxite, the French customs gave it a denominated place in the statistical tables of 1907, previous to which it was entered with "Undenominated Minerals."

New Publications

GURLEY'S MANUAL. Forty-first Edition. Pp. 470; illustrated. 4½x7 in.; cloth, 50c. Troy, N. Y., 1908: W. & L. E. Gurley.

This is the latest edition of a manual familiar to most engineers by long use. While intended chiefly to describe and illustrate the instruments made by W. & L. E. Gurley, it contains a large amount of information about the construction, use and care of instruments used in engineering and surveying. It is really a practical treatise on instruments of precision and can be conveniently used as a text-book. The number and variety of such instruments are now so great that every active engineer needs a reminder such as he finds in this manual.

DIRECTORY OF THE IRON AND STEEL WORKS OF THE UNITED STATES. Seventeenth edition; corrected to March 1, 1908. Compiled by the American Iron and Steel Association, James M. Swank, General Manager. Pp. 516. Cloth, 5½x8½ in. Price, $12. Philadelphia: The American Iron and Steel Association.

The American Iron and Steel Association is the final authority on all matters in the United States coming within its province. The information collected by it is probably more nearly complete than that to be obtained in any other country. It is unnecessary to say that the new edition of its "Directory" is a complete list of the works of all kinds which produce iron and steel in the United States, and is, therefore, necessary to everyone connected with those trades. It is carefully indexed, and is separated into various heads, such as blast furnaces, steel works, rolling mills, etc., etc. The information has been brought up to date, all the recent changes and consolidations being noted. The introduction is an interesting summary of the capacity of the various iron and steel plants in the country, including some account of the new works now under construction.

LIGHT LOCOMOTIVES. Prepared for the H. K. Porter Company. Pp. 224; illustrated. 6x9 in.; cloth. Pittsburg, Penn.; H. K. Porter Company.

Electric traction has not yet dispensed with the use of the light steam locomotive, which has such a wide field in and about mines, in industrial work, in open-pit operations such as are carried on at many large iron mines, and on railroads of small traffic. The H. K. Porter Company, of Pittsburg, which has for 42 years made a specialty of light locomotives for all kinds of surface and underground work, issues this book, which is much more than a trade catalog. Besides descriptions and illustrations of numerous types of locomotives built by the company, it contains useful tables, showing tractive force of locomotives; effect of grades and curves on hauling capacity; methods of laying out curves; weight of rails suitable for different service and various loads; and much other information serviceable for engineers who have occasion to build or use light railroads. There are also statements of the comparative cost of locomotive and other forms of traction. All the tables are fully explained, and their use illustrated. This is one of the catalogs that will be kept as a book of reference.

A REPORT TO THE BITUMINOUS COAL TRADE ASSOCIATION ON THE PRESENT AND FUTURE OF THE BITUMINOUS COAL TRADE, 1908. By Henry S. Fleming. Pp. 87, 40 tables. 7x10 in. New York, 1908: The Bituminous Coal Trade Association.

This report was prepared by Henry S. Fleming, who is secretary and treasurer of the Bituminous Coal Trade Association, for the information of its members. It contains a mass of information on production, consumption and exports of coal in the United States, compiled from official sources, arranged and presented chiefly in tables and diagrams, and therefore in condensed form. It is, of course, impossible to verify all this; but it presents every evidence of careful and thorough work. Certainly no such condensed showing is accessible elsewhere in the same space, and the report is a valuable one for reference. Mr. Fleming has not contented himself with past and present statistics; he devotes a few pages of his book to a forecast of the growth of coal production and consumption in this and other countries up to the year 1950. This forecast is based on an analytical treatment of the course of production over a series of years, and is not intended to give accurate figures so much as the general tendency. It is, of course, probable that improvements in the methods of utilizing fuel, in metallurgical operations and in industrial pursuits, may bring about important changes in the future, as they have in the past, by reducing the consumption of coal per unit of product. This Mr. Fleming himself admits; but such changes must be gradual. All forecasts must be largely a matter of opinion, and opinions will differ considerably as to this. Another section is devoted to an estimate of the coal resources of the world, so far as they are known. Unfortunately definite knowledge on this point is scarce, outside of a few of the leading countries. With regard to the past production of the United States, one or rather two remarkable points are brought out by the tables and diagrams; that is, that from 1840 to 1905 there have only been five years in which the production of bituminous coal has been less than the preceding year; and that from 1826 to the present time the production of any 10 years has been greater than the total from 1826 to the beginning of that 10 years.

NINTH ANNUAL REPORT OF THE MINING INDUSTRY OF IDAHO FOR THE YEAR 1907. Robert N. Bell. Pp. 217; illustrated. 6x9 in.; paper. Boise, Idaho, 1908: Robert N. Bell, State Inspector of Mines.

WATER RESOURCES OF BEAVER VALLEY, UTAH. By Willis T. Lee. United States Geological Survey, Water-supply Paper No. 217. Pp. 57; illustrated. 6x9 in.; paper. Washington, 1908: Government Printing Office.

RESULTS OF SPIRIT LEVELING IN CALIFORNIA, 1896 to 1907, INCLUSIVE. By S. S. Gannett and D. H. Baldwin. U. S. Geological Survey. Bulletin No. 342. Pp. 172. 6x9 in.; paper. Washington, 1908: Government Printing Office.

A PRELIMINARY REPORT ON THE MANGANESE DEPOSITS OF GEORGIA. By Thomas L. Watson. Geological Survey of Georgia. Bulletin No. 14. Pp. 190; illustrated. 7x10 in.; cloth. Atlanta, Ga., 1908: The Franklin-Turner Company.

REPORT OF THE UNITED STATES FUEL-TESTING PLANT AT ST. LOUIS, MO., January 1, 1906, to June 30, 1907. Joseph A. Holmes in charge. Bulletin No. 332, United States Geological Survey. Pp. 299. 6x9 in.; paper. Washington, D. C., 1908: Government Printing Office.

GEOLOGY OF THE ADIRONDACK MAGNETIC IRON ORES. By David H. Newland, with a report on the Mineville-Port Henry Mine Group, by James F. Kemp. Bulletin No. 423, University of the State of New York, Education Department, April, 1908. Pp. 182; illustrated. 6x9 in.; paper. Albany, 1908: University of the State of New York.

ORGANIZATION, EQUIPMENT AND OPERATION OF THE STRUCTURAL-MATERIALS TESTING LABORATORIES AT ST. LOUIS, MO. By Richard L. Humphrey, with Preface by Joseph A. Holmes. United States Geological Survey, Bulletin No. 329. Pp. 84; illustrated. 6x9 in.; paper. Washington, 1908: Government Printing Office.

WATER-SUPPLY INVESTIGATIONS IN ALASKA, 1906-1907; NOME AND KOUGAROK REGIONS, SEWARD PENINSULA; FAIRBANKS DISTRICT; YUKON-TANANA REGION. By Fred F. Henshaw and C. C. Covert. U. S. Geological Survey, Water-supply Paper No. 218. Pp. 156, illustrated. 6x9 in.; paper. Washington, 1908: Government Printing Office.

In reviewing Heess' "Practical Methods for the Iron and Steel Works" in the JOURNAL of April 18, we gave the price incorrectly as $1.25. The correct figure should have been $1.

Proposed Anti-foreign Mining Law in Mexico

Mining circles in Mexico are considerably worked up about several provisions of the proposed new mining law which has been prepared in the department of the Minister of Fomento, and is now being considered by him, and of which the preliminary draft has been presented to the mining men of the republic, through the Mexico City chamber of mines, for their perusal and comment. Most noticeable and most surprising in this new law is the strong feeling against the foreigner made evident by the four articles which have so stirred up the people, and which are as follows:

"Art. 141—No title deed for mining property can be issued to foreigners denouncing properties within the bounds of border states, if they do not previously obtain a special permission from the executive of the Union. This requirement will also be exacted when the denouncement is made conjointly by foreigners and Mexicans. If the permission is refused, the ground shall be declared free and the same effects as those consequent on voluntary abandonment of a denouncement, as set forth in article 36, will follow.

"Art. 142—The permission mentioned in the foregoing article will also be necessary in order that foreigners may through any other process come into possession of mining properties or liens thereon in any of the border states or territories.

"Art. 143—The rules of practice will determine the periods of time within which the permissions mentioned in the two foregoing articles must be solicited, and the conditions subject to which they may be granted.

"Art. 144—Foreign corporate bodies are incapable of denouncing and acquiring henceforth, by any process, either mining properties or liens thereon, within the territory of the Mexican Republic."

The Measure Not Likely to Pass

It is not really believed for a minute that such a law could pass and it is very doubtful whether it will ever be presented to the Mexican Congress in that shape, but how any man supposedly big enough to have attained a position in the Cabinet (the Minister of Fomento) could have been so narrow as to have permitted such a measure even to have been countenanced in his department, much less actually to have been drafted into a bill for presentation to Congress is beyond comprehension

The conditions stated in Articles 141, 142 and 143 have for many years been in force in what was known as the "free zone," a strip 20 leagues in width along the northern border between the United States and Mexico. But that section is really of so little genuine importance that small attention has been paid to it, especially since permission was easily obtained. These new articles, however, are made to read so that they include Lower California, Sonora, Chihuahua, Coahuila, Nuevo Leon and Tamaulipas, or almost the entire northern half of the republic, and embracing many of the most important mining sections of Mexico, and the many difficulties and delays incident to obtaining the necessary permission to denounce or obtain mineral rights in these states under the proposed new law would make it so onerous that foreign capital, which cannot be forced but must be humored, would not make the attempt, and this entire section would be paralyzed. And the idea of Article 144 to compel foreign mining companies to incorporate in Mexico, thereby necessitating the holding of meetings in Mexico, and the location of the principal offices there, and the consequent residence of the principal officers in the republic, is also more than foreign capital will stand for. Fancy the big capitalists, American, English and French, with interests all over the world, coming to Mexico to live because they chanced to have a few dollars invested there!

As before stated, it is not believed that these articles could ever pass the Mexican Congress. A number of able and alert men of Mexico, headed by Lic. José L. Riqueña, have already given voice to the strongest opposition to these measures, and it is also believed that President Diaz will awaken to the importance of the situation.

Transvaal Mining Notes

Special Correspondence

Considerable disappointment has been caused by the partial collapse of the scheme tried at the Ferreira Deep to solve the unemployed problem by using white men only on the Gordon drills. The experiment was started some weeks ago, and the community was hopeful that at last a solution had been found for one of the most difficult problems on the Rand today. It was announced May 10 that the management had decided to discharge all save 16 or 20 of the best workers, and put on Kafirs. The white men who remain on will be given a stope to themselves, while the natives will carry on operations in the other stopes, under the supervision of a certificated miner.

Altogether about 30 shifts have been worked, and during that time the contractors have lost a large sum of money. The two main reasons why the experiment has been so disappointing seem to be troubles in connection with the water supply and the inefficiency of a large number of the white men employed.

With the men who still remain at work, there should be no excuse in the future. Every assistance will be given them, and as they appear eager to make the experiment a success, and are a willing crowd, it is to be hoped they will be able to make a living wage at this work. When the experiment was commenced it was hoped that the men would be able to drill six to 10, or perhaps 12, holes at 30c. each, and thus earn a good wage, but the average earnings, it seems, have so far been only about $1.20 per day.

It is most unfortunate that this experiment has not been a success. The problem of the white unemployed is the one that worries the statesmen of this country as much as any other. Unless openings are made for the white man, and he is induced to do the work of the country, South Africa will rapidly become a second India, with a few white bosses and a large number of natives doing the work. It is a problem for the coming generation, for publicists declare that unless openings are made for white men, the large number of white boys now growing up will be unable to find employment, and must either leave the country or starve.

It is the importance of the problem from the political and social points of view that is forcing hundreds of people to exclaim that work must be found for more white men in the mining industry, even if they are more expensive than Kafirs. Whether the Government will legislate to force the mines to take on more white men remains to be seen. It is known that the present Government views the unmployed problem with dismay, deploring the decreased number of white men employed on the mines, and is most anxious to increase the white population of the Transvaal. How to keep down working costs and at the same time employ more whites, who, as a rule, are an inferior class of workers, is a problem that most mine managers find insoluble. From a purely economic point of view a decrease in the number of whites on the mines, up to a certain point, is desirable. The political and economic points of view conflict somewhat.

During April there was a gain on native labor figures, and a loss on Chinese. There are now 24,059 coolies at work on the mines of the Rand, and the figure will rapidly decrease, for the Chinese are being sent away as quickly as their time is up. The mines have all the labor they require just now, as there are thousands of Kafirs ready to come to work.

The largest producer of gold during April was the Simmer & Jack mine, which turned out 25,600 oz., valued at £108,742, and made a profit of £63,658. Second on the list was the Robinson mine, with an output of 25,410 oz., valued at £107,935, and showing a profit of £80,076. Third was the Robinson Deep, which produced 19,461 oz. of gold, valued at £82,665, and made £39,052 profit.

Personal

Mining and metallurgical engineers are invited to keep THE ENGINEERING AND MINING JOURNAL informed of their movements and appointments.

J. Parke Channing has returned from Europe.

J. W. Childress, of Los Angeles, is in Mexico on business.

Francis C. Lincoln, of Butte, Mon., is in New York on professional business.

N. B. Storer, president of the Mexican Union mines, of Chicago, is on a visit to the company's properties in Jalisco, Mexico.

A. G. Larson, superintendent of Le Roi mine at Rossland, B. C., has lately been visiting Seattle, Victoria, and other coast cities.

C. Sands and C. M. Wright, of New York, are in Oaxaca, Mexico, examining mining properties in which they are interested.

T. R. Murphy, together with J. S. Johnson and J. H. Greenwood, all of Denver, Colo., is in Mexico examining mining properties.

John Hays Hammond has announced that he is a candidate for the Republican nomination for Vice-President of the United States.

G. W. Bryant, vice-president of the Guanajuato Development Company, Guanajuato, Mexico, is in New York on business of the company.

Major J. E. P. Vereker, who is largely interested in mining properties in the Lake of the Woods district, Ontario, has returned from a trip to England.

Charles W. Wright, of Houghton, Mich., is on his way to Alaska, where he will be employed in field work for the United States Geological Survey.

Alexander Smith, manager of the Surprise mine in the Slocan district of British Columbia, has returned to Sandon after having spent the winter in Ontario.

Harold B. Goodrich, manager of fuel oil properties for the Santa Fé Railroad, is examining oil lands in California on behalf of Spurr & Cox, Inc., New York.

P. R. Whitman has left Concheño, Chihuahua, for Indé, Durango, Mexico, to take the position of cyanide superintendent with the Indé Gold Mining Company.

H. E. West will return to London on Aug. 1, after two years in Siberia in the services of the Spassky Copper mine, Ltd. He proposes later to reside on the Pacific slope.

Bainbridge, Seymour & Co., the well known firm of mining engineers so long associated with St. Helen's Place, will shortly move into larger offices at Salisbury House, London.

Dr. L. L. Hubbard, president of the Ojibway company and general manager of the St. Mary's Mineral Land Company, has returned to the Lake Superior country after three months in Europe.

Charles Camsell, of the Canadian Geological Survey, has gone to British Columbia to investigate the occurrence of gold and platinum in the rocks along the Similkameen river.

Professor Robert H. Richards has just returned to Boston from Missouri, where he has been engaged professionally. While there the University of Missouri conferred upon him the degree of doctor of laws.

E. McCormick has been appointed general superintendent of the Luna Lead Company operating in New Mexico with headquarters at Deming, where is situated the plant of the National Mining and Smelting Company.

W. H. Trewartha James, general manager of the Tyee Copper Company, with headquarters at Victoria, B. C., went up to Whitehorse copper camp, in southern Yukon, last month to examine several mining properties there.

A. C. Gardé, of Nelson, B. C., was at Prince Rupert in Skeena mining division, British Columbia, lately. Prince Rupert is to be the Pacific terminus of the Grand Trunk Pacific railway, now in course of construction in western Canada.

W. A. Crist, general manager of the Berwind-White Coal Company's operations and plants in Somerset county, Penn,. with head-quarters at Windber and Johnstown, has resigned this position to devote his time to his personal business interests. Mr. Crist has been identified with the company for 32 years.

Obituary

Peter White, of Marquette, Mich., a pioneer, and widely known throughout the Lake Superior country, died suddenly in Detroit, June 6. An extended notice of his life and services will be found on another page.

Societies and Technical Schools

Case School of Applied Science—The junior class of the mining department of this institution, Cleveland, Ohio, has just left for the annual trip to the copper and iron mines of the Lake Superior district. The Marquette and Gogebic iron ranges and the copper region will be visited. The sophomore miners of the same institution have left for Holden, W. Va., where a month will be spent surveying in the mines of the United States Coal and Oil Company.

American Chemical Society—The thirty-eighth general meeting of the Society will be held in New Haven, Conn., June 30, July 1 and 2. The society will, as usual, meet in sections on account of the large number of papers to be presented. The sections will meet in the lecture rooms of the Sheffield Scientific School of Yale University, and will be under the chairmanship of the following members: Agricultural and Food, A. L. Winton; Biological and Sanitary, Thomas B. Osborne; Physical, Frank K. Cameron; Organic, Wm. McPherson; Inorganic, Philip E. Browning; Industrial, Wm. D. Richardson. Papers intended for these sections must be sent to the chairman or to Charles L. Parsons, secretary, New Hampshire College, Durham, N. H., before June 10. A division of Industrial Chemists and Chemical Engineers will be organized at this meeting, and a large attendance is expected.

West Virginia Mining Institute—As heretofore noted, the meeting to organize a State mining institute for West Virginia will be held at Clarksburg, June 29 and 30. It is not intended to make that place the permanent headquarters; the place for holding meetings will be decided by the institute after organization. Mining engineers, mine superintendents and foremen in West Virginia are invited to attend the meeting and join in the organization.

The program arranged provides for three sessions. Addresses will be made and papers read by Ex-Gov. George V. Atkinson and E. W. Parker, Washington; C. L. Fay, Greensburg, Penn.; State Geologist I. C. White, Morgantown, W. Va.; James W. Paul, chief of the State Department of Mines; Neil Robinson and John G. Ross, Charleston; Joseph Virgin, Plymouth; Fred C. Keighley, past president of the Coal Mining Institute of America, and others.

Construction News

Ensley, Alabama—The Semet-Solvay Company is preparing to erect additional by-product coke ovens at its plant.

Hazel Creek, California—The Hazel Mining Company is arranging to enlarge the mill at the Gladstone mine; also the power plant on Crystal creek. Twenty stamps will be added to the mill.

Columbia, Tennessee—The Independent Phosphate Company is preparing to erect a large washing plant. O. L. Dortch, Columbia, Tenn., is general manager, and H. D. Ruhm, chief engineer.

Thorold, Ontario—The smelter of the North American Smelting and Refining Company, which is owned by the controlling interests of the Coniagas mine, Cobalt, is completed. A test of the furnaces which was made June 2 proved satisfactory and the plant is now in operation employing a force of about 50 men. Several carloads of Cobalt ore have been received. The smelter will at first handle ore from the Coniagas only, but may afterward treat ore from other mines.

Special Correspondence from Mining Centers

News of the Industry Reported by Special Representatives at Goldfield, Butte, Salt Lake City, Denver, San Francisco and Toronto

REVIEWS OF IMPORTANT EVENTS

San Francisco

June 3—The recent successful action against hydraulic miners has encouraged the board of supervisors of Sutter county, to order suits brought against gold-dredge operators at Oroville, Butte county, and the board has adopted a resolution directing such suits to be begun. This action is significant in that it is the first official notification that litigation against the dredging industry has been commenced by the "cow counties." Numbers of threats have been made about proceeding against the dredge men, but no definite action has been taken until now. The dredgers are not dumping anything into the rivers which was not there before, and the majority are operating a mile or two from the river and are landlocked. But the trouble is that suits of this character are brought in counties which are inimical to mining on general principles, and before courts the judges of which are elected by the people of these counties. Under these circumstances the miner usually gets the worst of it and is in danger of being enjoined from further operations. However, the dredge men have long since prepared themselves for some such proceeding as this and will not tamely submit to have their property rendered useless. The hydraulic miners have no funds to carry on litigation, but the dredge miners are prosperous and in a position to defend themselves vigorously.

The only large roaster at the Selby Smelting Company works near Port Costa, which has been in use lately, has now been closed down for a time, while Solano county officials make examination into the question of smelter fumes, which, they claim, are damaging agricultural property. The direction, character and speed of the prevailing winds are to be investigated and recorded, and the question of fume and smelter smoke investigated. The residents of the little town of Selby are seriously affected by loss of employment while work stops, even temporarily, at the smelters but the Solano county people, on the other side of Carquinez straits, are looking after their own interests only. The Cottrell process for preventing the smelter fumes escaping is apparently successful at these works, where it is being tried, but the tests have not as yet been finally completed. Those in a position to know, however, are firm in their belief that the system adopted virtually puts an end to the fume nuisance. In case of any litigation they are now prepared to prove this to the satisfaction of the courts.

The famous Quartz Mountain fiasco of La Societe Anonyme des Mines d' Or de Quartz Mountain, of Norbonne, France is recalled by the action of the supervisors of Madera county recently in canceling an assessment, delinquent tax entry certificate of tax sale and tax deed for the claims formerly known as the Foster, None Such, Tozer, Defries, Morgan and Seaton mines, constituting the Quartz Mountain properties. In 1885 the claims were assessed to La Societe Anonyme des Mines d' Or de Quartz Mountain, the taxes assessed upon the unpatented public domain of the United States, when the paramount title was in the general government. The corporation was a foreign one of Norbonne, France, but it never acquired patent for any of the lands and the taxes never having been paid the six claims were sold in May, 1886, to the State. The assessment and taxation and the property sale to the State were shown to have been unlawful and void because of the act of Congress admitting the State of California to the union forbidding the assessment, taxation, and sale of the public domain of the United States by the State of California. The claims now revert to W. H. Larsen and others of Madera. The French company expended millions of dollars in the purchase and equipment of these properties which never yielded a dollar. Some of the fine buildings and structures still remain on Table mountain, but the machinery has about rusted away. The French company has long since gone out of existence and the claims have been re-located by others, who have just cleared title.

A gold strike in the O'Hara mine near Sonora, Tuolumne county, has attracted numbers of mining men to that section who are looking up old prospects with a view to opening them.

The Experanza gravel channel, three miles from Mokelumne Hill, owned by S. L. Davidson and worked under lease by McSorley Bros., has commenced to yield very handsomely and many nuggets are being taken out. The gravel deposit has been found within the last three months, though the existence of the channel was known in that vicinity. They are now running along the center of the main channel before crosscutting to find the width. In August, 1848, a soldier of Stevenson's regiment found one of the largest nuggets ever obtained in this State, on the Mokelumne river, where the Esperanza channel empties into it. The nugget was sold at the Philadelphia Mint for $9416. Nuggets up to $50 value are now being found in the center of the channel.

In the Humboldt county case of Jonas Salstrom against the Orleans Bar Gold Mining Company, the superior court in 1905 awarded the plaintiff $9000 damages because his ground was covered up by tailings from the mining company's operations. The decision was appealed from, and now the State supreme court reverses it, and the case will be re-tried.

The Conlan mine, Grass Valley, owned by citizens of Davenport, Iowa, has been closed down for some months owing to lack of funds. Representatives of the stockholders have now come to Grass Valley and are authorized to expend certain sums in prospecting. The drift started by General-Manager Brunnier will now be extended to cut the Comet ledge.

The New York-Grass Valley Mining Company was organized a few years since to work the old Perrin mine at Grass Valley, Nevada county, and did so for a time. The shares were very extensively advertised and were sold in large blocks all over the United States, but mainly in the East. The men who backed the original management finally organized the Prudential Mining Company and loaned the New York-Grass Valley Company enough money to pay off the debts, taking a mortgage for a year. The money was not paid and last month the property passed into the hands of the Prudential Mining Company, the principal stockholders of which are Messrs. Bennett, Heazleton, Anderson, Boole and Peyton, of San Francisco. A. P. Wilson is the new superintendent, and George Bennett, of this city is president. Men have been set at work opening up the mine properly.

Goldfield, Nevada

June 2—Deputy State Treasurer F. L. Wilder has filed a $1,000,000 bond as receiver for the State Bank Trust Company and will proceed at once toward cleaning up the bank's affairs. It is now his intention to clean up the other branches, except Tonopah and Goldfield, and ultimately to have all the work of all the branches done here. The bond is the biggest ever filed in this State and five different companies are in the bond, no one company being willing to underwrite the whole risk.

Another large suit was filed this week. Geo. B. Mechem one of the earliest pioneers of Cripple Creek brought suit against L. L. Patrick, of Goldfield for $285,000 claiming violation of a grubstake agree-

ment. Patrick came to Goldfield in the early days after having prospected rather unsuccessfully in British Columbia, Idaho, and later in Tonopah. After coming to Goldfield he secured an option on the Combination mine which he turned into the Consolidated merger at a very large profit. He was at that time president of Patrick, Elliott & Camp, a brokerage and promotion company which was very successful and wise enough to go out of business just at the top of the boom, after, however, the cream had been skimmed. He is now president of the First National Bank of Goldfield.

Considerable interest and excitement has been rife this week about apparently authentic reports, yet denied by both parties, of impending apex litigation between the Consolidated and the Florence. Such a suit between such powerful rivals would be a calamity to the camp and both sides deny any knowledge of the origin of the rumor. The Consolidated owns the Combination No. 3 and the Rustler Fraction which sideline the Red King and Florence claims of the Florence company and in close proximity to the famous Little Florence lead. Leasers are at work at several places on both the former claims also on the O. K. Fraction, another adjoining Consolidated property.

Rawhide, Nevada

May 29—Rawhide has been the scene of rapid development work during the few months that it has been known to the world, and the notion that the camp is in a "stringer" district has been dispelled. Several properties have developed deposits of good size carrying valuable ore. The most promising bodies thus far discovered have been found in the three chief hills, Balloon, Grutt and Hooligan hills. The properties showing the richest ore at present are the St. Ives Lease, Original Rawhide, Murray, Kearns Nos. 1 and 2, and the Ogilvie-Reynolds Lease.

All these properties have developed shipping ore, and the Murray lease shows sufficient to warrant the erection of a reduction plant. Hooligan hill is showing some very high-grade silver ore. One of the most important strikes of the camp was recently made on this hill and is being developed as the Walker lease by the Rawhide Aspen Mines Company. This company has cut a ledge 18 in. wide at a depth of 65 ft. which carries more than $100 per ton in silver and gold. Many other properties promise to be profitable as soon as the camp is equipped with milling facilities for handling the local ore.

The Rawhide Western Railroad, now under construction from Walker Junction on the Southern Pacific to Rawhide, is expected to be completed by Aug. 1. Later it will be extended to Fairview, Bovard and other camps in the neighborhood. This line, when completed, will afford low shipping rates to Walker Lake, where Geo. H. Bradford, of San Francisco, and associates are preparing to erect a reduction plant for the ores of this district.

A drill hole on the property of the Rawhide Northern Consolidated Mining Company, now down 836 ft., struck sulphide ore at a depth of 137 ft. and continued in the body for 200 ft. Samples taken every 5 ft. averaged between $5 and $6 per ton, the lowest assay being $3.80 and the highest $10.50 per ton.

Bovard, about 18 miles south of Rawhide, is the scene of one of the richest strikes made in Nevada this year. So far only one vein has been found in the camp, but that shows ore of remarkable value. At present the shaft has reached a depth of only 22 ft., but this slight development has already yielded 700 sacks of ore carrying $750 per ton in gold and silver.

Wallace, Idaho

June 3—Now that it is practically certain that the Hecla mine at Burke will resume about the beginning of the month and that active operations will be re-started in the closed properties of the Federal Mining and Smelting Company as soon as the present price of lead has been demonstrated stable, mining conditions generally are assuming a brighter aspect throughout the Cœur d'Alenes. With regard to the Hecla mine it is now understood that all the machinery recently installed by the company has been tested and accepted. The new sorting plant for the Hercules mine has arrived and is being installed at present by a Denver firm. The recent strike in the Tiger-Poorman mine operated by the Federal Mining and Smelting Company at Frisco has been developed to a considerable extent and has proved much more important than was at first anticipated. Arrangements have been completed by which the Tamarack & Chesapeake Company, controlled by Harry L. Day and associates, will acquire by purchase the Custer group of claims on which Mr. Day recently made a final payment. An important mining deal has just been consummated whereby A. M. Stroder, of Mullan has given a controlling option on the property of the Mineral Farm Mining Company. The Bullion Mining Company has levied an assessment of two and a half mills payable July 14. The delinquent sale has been set for August 18.

Work on the Pilot mine at Murray is to be resumed June 1. A crosscut adit which was started some time ago will be continued toward the lead. The work of driving the long lower adit on the Copper King property at Mullan has been commenced. The adit as planned will be about 4150 ft. in length in order to tap the ore exposed in the upper workings, and will have a depth of about 800 ft. greater than the lowest of the present workings. The new mill of the Charles Dickens property on Moon creek is about to be put in operation. There is now enough ore mined to guarantee the running of the mill for some time to come.

The Stanley Mining Company has commenced a suit against the Hercules owners for $27,500 damages. It is alleged that the waters of the Stanley water right have been so muddied through the operation of the Hercules that it cannot be used for milling purposes, practically stopping the Stanley mill from running. The Stanley company is steadily shipping about 25 tons of ore daily. It is reported that nothing but the gold of this ore is being saved at the present time, and that the antimony is being sacrificed owing to the impossibility of finding a suitable market. Over 500 men are now employed at the famous Bunker Hill & Sullivan mine and for some time the company has had under consideration the advisability of putting on an additional 200 men to develop the Sullivan ground. This project has been abandoned, however. At present the mine is producing from 1100 to 1200 tons of ore per day and this after reduction makes a monthly production of about 7000 tons. The crew on the construction of the Idaho Northern Railroad, which will open up the whole north side of the Cœur d'Alene mining district, has been augmented by an additional force of 500 men and has at last commenced the actual laying of the rails.

Salt Lake City

June 5—Development of the coal and oil region in southwestern Utah, in the counties of Iron and Washington, has been undertaken by Los Angeles and southern Nevada capital. In Los Angeles last week, a company was formed to exploit the coal measures near New Harmony. It has been announced that it is the purpose to provide the mines with large equipment, and to build a railroad to connect with the main line of the Salt Lake route. It is said the New Harmony mines will turn out 1000 tons of coal daily and that the company will cater to the southern California market. Near Virgin City, there is much development under way in the oilfield. The Virgin Oil and Development Company has brought in two commercial wells, one producing 25 and the other 40 bbl. per day.

The property of the Sevier Consolidated Mining Company near Kimberly, Utah, has been bought in under an execution for $108,206 and will probably be reorganized when the time limit for redemption expires. The company spent nearly $250,000 in mine equipment and development last year without accomplishing satisfactory results, the management having made the very serious mistake of not employing competent mining engineers.

The annual meeting of the Ohio Copper Company, which was to have taken place in Portland, Me., June 3, was postponed

for 30 days. It is said the leading interests have agreed on a plan to finance the enterprise.

A statement given out at the annual meeting of the shareholders of the Uncle Sam Consolidated Mining Company shows that ore production was carried on during six months of the past fiscal year and that shipments were stopped on Nov. 15 last, as the United States Smelting Company, refused to accept them, as a result of adverse smelter-smoke litigation. Altogether there were 112 carloads of ore sold, which netted $25.42 per ton, or a total of $102,752, and dividends were paid to the amount of $70,000. At the beginning of the fiscal year the company was in debt $9253 and closed with $383 in cash on hand. Since shipments ceased development has been carried on vigorously. Production will be resumed again in July.

The consolidation of the Swansea and South Swansea mines in Tintic has been ratified by shareholders. A new organization, to be known as the Swansea Consolidated Mining Company, will operate the two properties.

Salt Lake City has received recognition from the National Government as being a mining center of great importance through the passage of a bill by the late Congress providing an appropriation of $29,000 for the establishment and equipment of an assay office here. The bill has been signed by the President and has become a law.

A controlling interest in the old Emma silver-lead mine at Alta, one of the original producers of that camp, has been acquired by Jesse Knight, of Provo, Utah.

The May Day Mining Company has resumed dividend payments. Shareholders will receive 1c. a share, or $8000 this month.

The Silver King Coalition Mines Company, at Park city, has been sued by the Silver King Consolidated Mining Company, two cases having been filed in the Federal Court involving claims aggregating approximately $1,500,000. One is a case in equity, and the defendant is charged with having extracted ore from property owned jointly by the two corporations for which no accounting has ever been made. The second complaint charges trespass and unlawful taking of ore from property owned entirely by the plaintiff company.

The Consolidated Mercur Gold Mines Company sent about $65,000 worth of gold bullion to the United States mint at Denver last week, the shipment representing the April production of the Mercur mine at Mercur.

It has been ascertained from good authority that the plan to consolidate several of the leading mines of the Park City district has been taken up again. The properties mentioned for the merger are the Daly-West, Daly, Ontario and Naildriver, all of which are under the same management. This movement was inaugurated several years ago, but the caving-in of the Ontario drain adit, followed later by the panic in the financial world, had the effect of delaying a consummation of the deal. The Ontario and Daly companies are jointly interested in the ownership of the Weber Coal Company, also the Park City electric-light plant.

It is expected that the Ogden smeltery, recently leased to the Independent Smelting Company, will be in operation within a week.

Advices from the executive offices of the Majestic Copper Company are to the effect that an effort is being put forth to effect a reorganization with the hope of again placing the concern on a sound footing. It owns properties in Beaver county, which were operated with considerable success during the high copper market a little more than a year ago, but the decline in the latter part of last year made it necessary to stop production.

Denver

June 4—It is reported that another historic mine, the old Caribou, in Boulder county, has been leased, and will be reopened. This is one of the great silver mines which was discovered in 1869, and at that time shipped its first wagon-load of ore to Professor (afterward Senator) Hill's works at Black Hawk, 20 miles distant. In 1873 it was taken over by the Nederland Company, of Holland. The Dutch owners paid $1,500,000 in cash for it, but the story goes that the mine was stripped of most of its reserves of ore before it was turned over to them, and litigation, mismanagement and other troubles, culminated in their losing the property in 1876. It passed into other hands, and many years afterward was closed down, partly owing to the low price of silver, but it had then been worked to 1000 ft. in depth, and is credited with a gross production of $7,000,000.

An astonishing strike of rich gold ore has been made on the War Dance mine, in the neighborhood of Central City, Gilpin county. It is said that the leasers who opened it got $3000 for a wagon-load of ore about two months ago, and since then they received $13,000 for a small lot, and that a carload has just been sampled which will give them $40,000. It is an old mine, and has been idle for many years. The stuff that carries the gold is purple-stained rock, and this ore is not free milling. It was sent to the stamp mills years ago, and the results being nil, the mine was abandoned. The shaft is only 140 ft. deep, and the ore 2 ft. in width. This strike, and the news of the probable resumption of work on the Newhouse tunnel, has caused great activity around the Gilpin county mines.

Indianapolis

June 8—The Southern Indiana Railroad Company, in compliance with the order of the State Railroad Commission, on June 4 began receiving coal for shipment by way of the Big Four at the Terre Haute junction to Indianapolis and gas belt towns. The Southern Indiana insists, however, that freight charges he paid in advance. The operators will resist this because it will require considerable capital. Coal is sold on from 30 to 60 days' time and the operators must therefore wait for their money, while they are compelled to pay freight charges at once. The two roads had been unable to agree on the division of joint rates, and therefore no coal had been shipped for three weeks until the embargo was raised by order of the railroad commission backed by an order from court.

Toronto, Ont.

June 8—The Canadian Department of Mines has decided to undertake experimental work for the utilization of the extensive peat deposits of the country. An appropriation is to be made for the establishment of an experimental plant which will probably be located in Ottawa, while investigations will be carried on to determine methods of obtaining producer gas from peat, as well as other means of using peat for different industrial and domestic purposes. Arrangements are being made for obtaining the services of a Swedish expert, who can advise on methods and processes as employed in Europe. A further examination will also be made as to the extent and quality of Canadian peat beds.

Hon. W. S. Fielding, Canadian Minister of Finance, has introduced into Parliament a resolution extending, for a further term of five years or till June, 1913, the bounty on lead mined in Canada. Under the legislation which expires at the end of June the bounty was payable for five years to an amount not exceeding $500,000 in any one year at the rate of $15 per ton, to be reduced when lead reached the price of £12 10s. per long ton in London, Eng., and stopped altogether when the price reached £16. The new resolution makes some important changes, providing that the reduction in the rate of the bounty does not commence until the standard price in England reaches £14 10s. ceasing altogether as before when £16 is reached, and the limitation of $500,000 as the amount to be paid in any one year is removed, the only provision being that the total of the bounties paid for the five years shall not exceed $2,500,000.

A party of six men from the Toronto School of Science, including K. A. Mackenzine, R. E. W. Hagarty, C. R. Murdock, J. A. Walker, J. E. Gray and C. S. Cameron have left Toronto for Dawson City, Yukon, having been engaged by the Yukon Consolidated Gold Felds Company to take charge of a section of the hydraulic mining system about 15 miles from Dawson.

Mining News from All Parts of the World

New Enterprises, Installations of New Machinery, Development of Mines and Transfers of Property Reported by Special Correspondents

THE CURRENT HISTORY OF MINING

Arizona

MOHAVE COUNTY

Emerson—Butte, Mont., men have taken a lease and bond on this gold property at Chloride.

Vanderbilt—This mine has just made a clean-up of 200 tons of ore run in the Idaho-Columbus mill in Weaver district; the concentrated product is being shipped to the smeltery at El Paso.

Holy Moses—Several miners are employed on this property at Gold Flat. A steam hoist will be installed and three shifts of men will continue sinking. The mill is being refitted and will soon be crushing ore.

Elkhart—H. M. Bowen has purchased this property at Chloride. The new owner will begin work at once. The mine has a reserve of ore which can be handled in the 200-ton mill on the ground. The mine will be unwatered and while this is being done the mill will be overhauled. The water from the lower workings will be utilized in the mill.

New London—Several men under the superintendency of A. L. McGraw, are at work on this mill in the Cerbat range.

YAVAPAI COUNTY

Baumann Copper Company—This company will resume operations at its mines near Humboldt, shortly. Operations have been suspended for the past eight months.

Bullwhacker—Leasers operating this mine five miles east of Prescott have opened a large body of high-grade gold ore. The ore shoot is about 100 ft. long and 18 in. wide. The mine produced a large amount of high-grade ore a number of years ago.

Alvarado Gold Mining Company—This company, operating near Congress, has been remodeling its mill for the past two months and will begin the reduction of ore. The property has been idle for a number of years. The mill is equipped with 10 stamps and a Huntington mill.

Redman Mining, Milling and Smelting Company—This company, operating near McCabe has its mill running steadily. It is reported that the milling capacity will be increased in the near future.

Buffalo-Arizona—This company operating near Turkey, has sent in a $4000 bar of bullion from its mill.

Cleopatra Copper Company—It is reported that this company has made a discovery of a new ledge in its mines near Jerome. The new find is a body of sulphide ore 3 ft. wide carrying gold and silver as well as copper.

California

AMADOR COUNTY

Dane & Mitchell—This mine, near Pine Grove, is now under bond from John F. Davis to John J. Cranmer, and operations have commenced. There is a 10-stamp mill on the property.

Defender—The ore milled during the past month averaged $6 per ton and the cost of mining and milling was $4 per ton.

Fremont Consolidated—In clearing out the shaft the men have reached the skip, which was found at the 1150 level. No bodies of men lost at the time of the fire in the shaft have yet been recovered. In another month the mill will be again running at full capacity.

South Eureka Mining Company—At this property, Sutter Creek, a body of free gold has been found on the 2600 level.

BUTTE COUNTY

Tests in the gravel found in the bar in the Feather river at the Hatch & Rock orchard, near Biggs, are satisfactory.

CALAVERAS COUNTY

Bullion—Frank Tryon has sold this mine in Albany Flat district, near Angels, to F. B. Pattee, M. Latham, James Drew and John Peirano of that place. The new owners have bought the Oriole 10-stamp mill and have put in a new hoist, air compressor and two machine drills.

Hyu Chikamin—This company has a concession on the Calaveras river, and will shortly commence operations on a large scale, machinery having been ordered.

EL DORADO COUNTY

Sherman—The foundations are nearly ready for the new 10-stamp mill, while the old five-stamp mill continues work. About 60 men are employed and arrangements are being made for deep mining. The double compartment shaft is now down to the 650 level. Thomas Clark is manager of this property, which is near Placerville.

INYO COUNTY

Inyo Buster—This company has been incorporated to work the Shaffer group at the new Kruger camp, four miles from the Cerro Gordo mine, 4½ miles from Keeler and two miles from Owens Lake. The property is being systematically developed and ore is being sacked and shipped.

Mazourka Cañon—Frank Lenot has made a gold strike in this cañon 15 miles from Independence, a little south of East Chrysopolis. A number of prospectors have gone into that section in consequence.

NEVADA COUNTY

Belle Union—After running a 400-ft. tunnel this company has cut the ledge and started drifting south in an 18-in. orebody of good milling quality. This is an old mine, worked many years ago. C. M. Peak is president.

Jenny Lind—The mill is being run with two shifts and it will be run 24 hours per day, as soon as sufficient gravel can be breasted out.

Mt. George—A company of Grass Valley miners has leased this claim at Indian Flat from John Curry, and three shifts will be kept at work sinking the shaft deeper.

PLACER COUNTY

Pacific—In this mine at Last Chance, owned by M. A. and E. E. Parmelee, they have found paying gravel in the Star channel but it may be on a bench and not in the bottom of the channel.

RIVERSIDE COUNTY

Indio District—There is some activity apparent in this district and several groups of placer claims have recently been located.

Morton—P. A. Phelps, of Reno, Nev., is arranging to install a hydraulic mining plant on this property near Light's cañon.

SAN BERNARDINO COUNTY

Italie—At this mine, Twenty-nine Palms district, a new shaft is being sunk south of the rich ore-shoot to catch the vein at a depth of 200 ft. on the dip. Fourteen miners are at work.

Ivanpah Mammoth—Some high-grade ore has been found in an 18-in. ledge in this mine near Ivanpah.

SAN BENITO COUNTY

Copper Mountain—This Salinas corporation is doing development work in the Melville district in the Palisades. H. J. Lind is superintendent.

SHASTA COUNTY

Gladstone—At this mine, owned by the Hazel Mining Company the power plant on Crystal creek, and the mill are both to be enlarged; 20 stamps will be added to the 40 now in use.

SAN DIEGO COUNTY

Boulder Creek—The new mill at the Pandora shaft in the Cuyamaca claim in this district has been put in operation. Ore from an old dump was first crushed.

Colorado—At this property, Grapevine district, a vein of ore has been struck after they had tunneled 850 ft. to reach it.

SIERRA COUNTY

Colombo—W. L. Fleming has secured an option on this old mine at Sierra City and will proceed at once to reopen it. He also has an option on the Elsie mine above Downieville.

SISKIYOU COUNTY

Gold Nugget—This company at Sawyer's Bar, R. A. Murray manager, will open up the mine at the lower end of the ground and enlarge the ditches. The season's run so far has been successful.

TUOLUMNE COUNTY

Eagle Shawmut—At this property, C. E. Uren superintendent, C. H. Craven is installing a slimes plant based on a new invention.

Harvard—In this mine, C. E. Shafer superintendent, 80 men are at work, and 60 stamps are kept dropping.

Truckenmiller—This property, which has been worked under bond for two years past, has been closed down indefinitely.

Colorado

The coal miners of the Northern district have voted, by a large majority, to reject the wage scale offered by the operators. No strike is expected, as the operators will probably submit a new agreement, with some modifications.

LA PLATA COUNTY

Porter—The buildings of this mine, six mines from Durango, were burned June 6, causing a heavy loss. The origin of the fire is unknown, according to the despatches.

LAKE COUNTY—LEADVILLE

The output for the Leadville district for the month of May was a little better than 65,000 tons of all classes of ore. Considering that all of the large producers of the district have curtailed shipments, this showing is good.

Fanny Rawlins—Several grades of ore are being shipped from this property, Breece hill, daily. Work is being pushed at the lower workings and the outlook is promising.

Hilltop—Regular shipments of zinc are being sent from this property, Horseshoe district, to the smelters in Kansas, and the returns are satisfactory to the lessees. The monthly tonnage will be increased, as the railroad switch has now reached the mine.

Dinero Tunnel—During the month of May 245 ft. were driven on this property, Sugar Loaf district, leaving 611 ft. to be driven before the Dinero veins are cut. The tunnel is making a little extra water, but not sufficient to interfere with the work.

Clipper—At a depth of 40 ft. a fair streak of ore was uncovered in this property, Hayden gulch, during the week, carrying gold, silver and copper; the ore is a sulphide. The Clipper is the extension of the Mayflower, which was worked some years ago; it is under lease to G. M. Drake and associates.

Highland Chief—During the last few months nothing but development work has been done on this property, Breece hill. Considerable ground has been opened and within a week shipments will be started.

Matchless—Recently Mrs. H. A. W. Tabor was able to pay off the Douglas mortgage on this famous old property, Fryer hill, and within a few weeks will resume work at both the upper and lower levels.

Catawba—Alex Harvey and associates are operating in the Canterbury hill section of the district, having secured control of 50 acres of ground. An inclined shaft was started near a flint outcropping, the flint wall being followed; the shaft had gone about 20 ft. when a small streak of ore was found and this was followed. A few days ago the streak widened out to 4 ft. of lead-silver ore, with a trace of gold in it. Development is being pushed on the strike to determine its extent. The contact is about 12 ft. thick between the flint and the dolomite. The ore has been opened in virgin territory, and will no doubt result in others looking for the extension. The formation and character of the ore is much the same as found in Fryer hill.

Helena—At this mine, Iowa gulch, the station at the 600-ft. level has been completed and the new pumps are being installed. Sinking another 200 ft. will begin soon.

Bix Six—At this mine, Breece hill, shipments from the new strike continue regularly and the ore runs well in gold, silver and lead. As development work proceeds the ore belt is on the increase.

SAN JUAN COUNTY

Gold King—Fire started in the surface buildings of this mine at Gladstone, June 6, and swept through them, destroying the ore-house, bunk-house and smaller buildings, and badly damaging the hoisting and other machinery. A number of men in the mine were nearly suffocated by the cutting off of the air supply, but all were finally rescued. One man was fatally injured. A report that six men had been killed is contradicted by later despatches. The fire, it is believed, was started purposely.

TELLER COUNTY—CRIPPLE CREEK

The May production of the Cripple Creek mines is given at 65,193 tons of ore, of a value of $1,354,320, estimated.

Drainage Tunnel—The deep drainage tunnel breast is now in 2520 ft. from the portal.

Little Clara—The Humphries-Thompson Leasing Company is working on this mine and making regular shipments.

Trilby—The concentrating department of the new mill has had a trial run, and is ready to start regular work. The mill will be started as soon as the roaster is ready.

Stratton's Independence—Under the new terms recently noted, 20 lessees are at work on this mine. The May shipments were nearly 600 tons of ore.

Indiana

DAVIESS COUNTY

Interest in the development of the Reeves township coalfield has been aroused by finding a 9-ft. vein of coal by oil prospectors, at a depth of 120 ft. The quality is said to be good. Plans are now being made to run a spur of the Baltimore & Ohio Southwestern Railroad into the new field and thus hasten the development of the field.

VANDERBURG COUNTY

The miners in this and adjacent counties have all returned to work. The mines are, for the most part, being operated nearly full time. Orders for summer storing are coming in, and the indications point to a big output for the remainder of the year.

Kansas

ZINC-LEAD DISTRICT

Lehigh Zinc Company—This company is erecting a 150-ton mill on its 22-acre lease at Lehigh. Two shafts are in ore at 85 ft. The water is handled with a 3-in. pump.

Michigan

COPPER

Superior—The crosscut from the ninth level is in the lode about 35 ft. and the formation is well mineralized throughout; the results shown at the upper levels continue with depth.

Copper Range—The shaft on the Globe tract is sinking from the 900-ft. level on its way to intercept the Baltic lode. The amygdaloid formation that was encountered in the crosscut at the sixth level will soon in all probability be cut in the shaft and its identity will be more fully established.

Lake—Sinking is being carried on and the drift is being extended from the first level; the southside drift is in the lode and crosscuts are being driven from the north-end drift to prove the ground.

Ojibway—Drifting is going on at No.

2 shaft and the Kearsarge lode is showing well at this point.

IRON

Penn Iron Mining Company—It has been decided to operate the properties of this company at Norway and Vulcan, on the Menominee range, only four days a week. The working force has been reduced by 75 men.

Munro Mining Company—This company has cut ore, at a depth of 180 ft., on its South Dunn exploration in the Crystal Falls district. It is reported that the orebody is a large one and that the ore is within the bessemer limit for phosphorus.

Missouri

ZINC-LEAD DISTRICT

Bird Dog—Ball & Gunning have completed a 250-ton mill at this mine, north of Webb City. The ore is found in sheet ground at 225 ft. depth.

Corrie-Cole—This company has completed its 200-ton mill at the old Beasley mines on Center creek. An electric plant is also being installed. The company is composed of M. A. and A. L. Shepard, of Chicago. A second 200-ton mill is being built by the same company on the lease north of this one.

Davey Land—A rich drill strike has been made on the Davey Crockett lease on this land near Webb City.

Delta—The mill of this company at Spring City is about completed and development will start soon.

Lizzie D.—This company has been incorporated with a capital stock of $48,000 to operate a 17-acre lease at Peacock. One shaft and six drill holes are in ore at 173 ft. depth. The stockholders are Dan F. Dwyer, E. P. Dwyer, Jas. F. Dwyer and Henry Ebermire, of Joplin, and S. Hurst, of St. Louis.

Midnight—This mine at Belleville, owned by Dr. George E. Ladd, is shut down, rebuilding the derrick and tram recently destroyed by a wind storm.

Moark-Nemo—This company is erecting two 350-ton mills on the Gwinn and Aylor lands, near Webb City. A central power house with two 125-h.p. gas engines and a Corliss compressor will furnish the power. Four jigs will be installed.

Murdock-McCullagh—This company is preparing to drain its ground at Cave Springs and start mining. The property adjoins the Herald.

Plutocrat—Clarence Playter, of the United Zinc Company, has leased the Plutocrat 40 acres on the Connor land, south of Carterville. A drill-hole is being put down on the line between this and the Hanover lease.

Sunrise—This company has installed a crusher and rolls at its mine at Spring City.

Temagami—This company has started sinking an inclined shaft at a pitch of 45 deg. at its mine west of Joplin on the Continental tract. It will be 6x8 ft. and timbered with square sets and will be 258 ft. long. The ore is in blanket formation at a depth of 190 ft. A skip holding two tons will be used for hoisting.

Yellow Dog—This company is sinking the third inclined shaft on its property, near Webb City. This incline will be equipped with a skip instead of an elevator.

Montana

The monthly report of the assay office at Helena shows a considerable gain in the production of precious metals in Montana as compared with last year. The total for May, 1908, was $155,122, as compared with $127,645 for May, 1907. Fergus county is first with nearly double the production of any other county in May. Chouteau ranked second and Madison third.

BUTTE DISTRICT

Butte Coalition—The company reports for 1907 a production of 377,240 tons of ore, yielding 51.47 lb. of copper and 1.18 oz. silver per ton; or 19,416,377 lb. fine copper, 444,810 oz. silver and 2480 oz. gold. This shows a considerable decrease as compared with 1906, when there was produced 336,420 tons of ore which yielded 24,995,112 lb. of fine copper, 730,225 oz. silver and 1500 oz. gold.

Nevada

ESMERALDA COUNTY—GOLDFIELD

Production—The production of the camp for the week ending June 2 was 1904 tons valued at $151,360 as follows: Gem, 33 tons; Mushett, 41 tons; Rogers Syndicate, 364 tons; Baker Lease on Sandstorm, 10 tons; Wingfield lease on Florence, 354 tons; Florence Queen, 2 tons; Great Bend, 51½ tons; Jumbo, 199 tons; Daisy, 95 tons; Newland Parkison lease on Victor, 11 tons; Baby Florence, 19½ tons; Waterman lease or Sandstorm, 15 tons; Mushett lease on Laguna, 50 tons.

Mohawk Combination Leasing—Work is being rushed to get the workings in shape for the four days of ore extraction granted the company by the arbitrators in the suit.

Diamondfield Black Butte—The company is doing development work which produces enough shipping ore to meet the payroll. The last shipment of 8½ tons yielded more than $500 per ton.

C. O. D Consolidated—This new merger will continue the policy of leasing its ground in addition to pushing development on company account. The opening up of the copper-bearing vein on the Gold Bar is being watched with interest. If a healthy orebody of copper could be opened up in the Goldfield district it would put a new face on the treatment problem.

Great Bend—The big flow of water which was encountered when the new vein was struck three weeks ago, which drowned out the shaft and lower workings, has been controlled and the drifts which caved badly have been cleaned out. A new vertical two-compartment shaft 500 ft. deep, will be sunk at once.

Mohawk Red Top—The lease, another of the McMillan-Holleran success, has encountered a vein which has a rich streak of $240 ore and the muck runs from $18 to $36 per ton.

Silver Pick—This ground adjoining the Mohawk on the east and the Combination on the north is about to resume work.

NYE COUNTY—TONOPAH

Ore Shipments—The ore shipments over the Tonopah & Goldfield railroad for the week ending May 30 to the Western Ore Purchasing Company, consisted of 100 tons from the Tonopah Extension. The Tonopah Company sent 3550 tons, the Belmont Company 750 tons, the Montana-Tonopah 1100 tons, the Jim Butler 120 tons, the Midway 100 tons, the North Star 35 tons, the West End 65 tons, and the MacNamara 100 tons to the mills, making the total shipments for the week 6820 tons. The total output of the Tonopah mines was 6820 tons, of an estimated value of $122,400.

MacNamara—A rich strike was made last week on the 300-ft. level, about 650 ft. west of the shaft. A streak of soft black silver ore 8 in. wide was found on the west face; this afterward widened to a face of ore 2 ft. wide. The ore is quartz, dark with sulphide carrying a high proportion of silver.

Jim Butler—Work is to be started on the company's property within a few days through the Stone Cabin shaft which has been idle for some time. The shaft will be extended from the present depth, 500 ft. to 700 ft., and development carried forward on the 100-, 200-, 300- and 400-ft. levels.

Tonopah Extension—All work in the mines is confined to the 550- and 600-ft. levels where new orebodies were found a few weeks ago. As work progresses the vein holds its own and proves very strong.

Tonopah Company—The 100 stamps in the mill are crushing about 3000 tons of dry ore per week of an average value of $23 per ton. During the week ending May 30 the mill produced 63 bars of bullion valued at $875 each, and 16 tons of concentrates worth $485 per ton. An average extraction of 90 per cent. is reported.

New Mexico

SIERRA COUNTY

Owing to the prevailing inactivity in the copper mines of the Southwest, there has been a considerable revival of interest in Kingston, the once famous silver camp.

Tip Top—This property has been bonded to Paul A. Larsh, manager of the Southwestern Lead and Coal Company in the Caballos mountains. Men have been working in two shifts and have uncovered rich silver ore.

Snowstorm and Atlantic—W. F. Traves, representing Eastern capitalists, has taken a lease and has begun work on these claims, and has also leased the old Kangaroo and Deadwood.

Comet—This old mine is to be reopened, the property having been bonded to Eastern capitalists.

Moffit Mining and Milling Company—This company contemplates starting its concentration plant in the near future. A month's trial run has been made and preparations are under way to operate continuously.

SOCORRO COUNTY

Tri-Bullion—The new separating mill of this company, which has been built by the Traylor Engineering Company, of New York, is nearly complete and is expected to go in operation about July 1.

Ohio

In accordance with the provisions of a law enacted at the last session of the General Assembly of Ohio, the mining counties of the State have been divided into 10 inspection districts instead of seven as previously:

First district—Jackson, Lawrence, Scioto, and a portion of Gallia. Inspector, Thomas Waters, Wellston, Jackson county.

Second district — Hocking, Vinton, Meigs, and a portion of Gallia. Inspector, Edward Kennedy, Sand Run, Hocking county.

Third district—Athens county. Inspector, John L. McDonald, Gloucester, Athens county.

Fourth district—Perry, Muskingum and Morgan counties. Inspector, James H. Pritchard, Hemlock, Perry county.

Fifth district—Guernsey, Noble and Washington counties. Inspector, W. H. Turner, Cambridge, Guernsey county.

Sixth district—Coshocton, Tuscarawas, Holmes, Wayne and Columbiana counties. Inspector, Alexander Smith, Mineral City, Tuscarawas county.

Seventh district—Stark, Medina, Summit, Portage, Mahoning and Trumbull counties. Inspector, W. H. Miller, Massillon.

The counties of Carroll, Harrison, Belmont and Jefferson will compose the eighth, ninth and tenth inspection districts, and the mines in these counties will be divided so that the work will be most convenient to the three inspectors. Inspector eighth district, Lot Jenkins, Klee, Belmont county. Inspector ninth district, Thomas Morrison, Sherodsville, Carroll county. Inspector tenth district, Ebenezer Jones, Martins Ferry.

The three new appointments are: Alexander Smith, Lot Jenkins and Edward Kennedy.

Columbus & Hocking Coal and Iron Company—This company reports for the year ending March 31, 1908, gross earnings of $864,759. Expenses were $675,532 and net earnings $189,227. Interest and taxes absorbed $129,058, leaving a surplus of $60,169 for the year. President N. L. C. Kachelmacher, in his report, says: "In the past year the company's coal industries continued to make progress. Whenever a sufficient supply of cars was available the daily output ranged from 3000 to 4000 tons. This producing capacity should be increased during the coming year and productionu costs are confidently expected to be reduced. The clay enterprise at Kachelmacher has been delayed. owing to the failure of various machinery builders to live up to their agreements. Preparations, however, are being made to start the brick plant. The company's brick operations can be relied upon to greatly exceed any revenue heretofore received from coal. The effect of the November financial panic is indicated by the fact that from about 70,000 tons in November, the company's tonnage declined to 19,000 in January."

Sunday Creek Coal Company—This company has been reorganized, the ownership of the stock having been transferred from the Hocking Valley Railroad Company to the Central Trust Company, of New York. The new president is William K. Field, until recently vice-president of the Pittsburg Coal Company. It is now reported that negotiations are in progress for the sale of the stock to the Pittsburg Coal Company, but this cannot be confirmed. The properties of the company include 84,000 acres of leased land and 16,000 acres owned in fee in the Hocking Valley and the Kanawha district of West Virginia, with over 100 mines in active operation.

Pennsylvania

BITUMINOUS COAL

Monongahela River Consolidated—This company reports for the six months of its fiscal year from Nov. 1 to April 30 as follows:

	1907.	1908.	Changes.
Net earnings..	$1,066,401	$1,128,717	I. $ 62,316
Charges.....	691,973	718,228	I. 26,255
Surplus.....	$ 374,428	$ 401,489	I. $ 36,061

The charges this year were: Allowance for coal mined, $226,027; depreciation of plant and equipment, $179,031; taxes and interest, $313,170. Coal shipments were almost the same in both years.

South Dakota

CUSTER COUNTY

Westinghouse Company—An increase in the production of mica is planned, at the mines here; 250 people are to be employed when the properties are in shape.

LAWRENCE COUNTY

Gold Eagle—Work on the property will be resumed. A new air plant has been installed and the tunnel will be pushed to the main orebody.

Golden Crest—A new 40-stamp mill with a capacity of 200 tons daily, is to be installed on this property at Two Bit. Work will be commenced soon.

Utah

JUAB COUNTY

Tintic Ore Shipments—The output from Tintic mines last week was 54 carloads; the Centennial Eureka shipping 44; Eureka Hill, 7; May Day, 4; Yankee Consolidated, 2; Utah, 1 car.

Colorado—A new compressor plant is being installed at this property.

Sioux Consolidated—What is declared to be an extension of the Colorado vein has been opened in this property in a winze from the 400 level. The strike was made last week.

Tintic Smelting—Inclement weather has greatly handicapped construction, but the management is confident that at least one lead furnace will be in commission by July.

SUMMIT COUNTY

Daly West—This company has increased its force to 60 men, and it is expected that the mill will be started again shortly.

Ontario Drain Adit—The management expects to complete the task of removing the débris from between Ontario shafts Nos. 1 and 2 within the next week. The avenue will then be entirely clear of obstruction.

Uintah Treasure Hill—The management has decided to install a new compressor plant.

Wisconsin

ZINC-LEAD DISTRICT

Benton—Plans are being prepared for a large custom-roasting plant at Benton for treating low-grade zinc ores and removing the iron pyrites by the roasting-magnetic process, in which several of the local mines are interested. The Fox mine has again started up after refusing a good offer, and is making from 20 to 30 tons of concentrates a day. The Frontier mine is the largest shipper in the district at present, as it is producing 25 to 30 tons of jack daily. The Calvert has completed shaft-sinking to its orebody, which is opening up as a strong, rich deposit of jack on a 10-o'clock course. The Cow mine is producing a carload of 80-per cent. lead ore, and about a car of zinc carbonate weekly. The Etna and Vandeventer are shipping regularly and earning fair

profits. The Aragon mine is being equipped with a new mill.

Hazel Green—The Mills mine has had its surface plant thoroughly overhauled while shut down during the winter. The mine has been unwatered and has again started up. The Scrabble creek plant is being overhauled, preparatory to starting up.

Mineral Point—One block of the zinc-oxide furnaces has been started up at the smelter, after being shut down since last fall. The other block is being overhauled before going into operation.

Platteville—The new electrostatic separating plant is said to be meeting with marked success, and has become an active buyer of low-grade ores. Options have been taken on several of the larger Platteville mines with the expectation of consolidating them in one large company.

Canada

BRITISH COLUMBIA—BOUNDARY

Granby Consolidated—The directors have declared a dividend of 2 per cent. on the stock, payable June 30. This is the first dividend since September last.

ONTARIO—COBALT DISTRICT

Ore Shipments—Shipments of ore for the week ending May 30 were as follows: Coniagas, 62,030 lb.; Drummond, 56,260; La Rose, 60,000; McKinley-Darragh, 66,540; Nipissing, 184,220; O'Brien, 254,810; Silver Queen, 110,310; Trethewey, 124,850; total, 919,020 pounds.

Silver Leaf—A recent shipment of 32½ tons of ore netted $106,000. The shaft on the big vein is down 150 ft. and the new vein encountered at 135 ft. shows rich at the bottom of the shaft; the vein is 4 in. wide.

Nancy Helen—A strike was made on May 25 consisting of a 5-in. vein carrying native silver at the 100-ft. level in No. 4 drift from the main shaft. Rich ore is being extracted and drifting along the vein has been started.

Nipissing—A rich strike was made May 29 on the 180-ft. level in a vein between vein 49 and the Kendall vein, which are over a quarter of a mile apart. The new vein is 4 in. thick and carries 3500 oz. silver to the ton. Rapid progress is being made in development work. In the section lying east of Cobalt lake veins 86 and 26, the Kendall vein and the Promise vein are being worked and the eastern extension of vein 49 is being operated by open cut. An adit is being run from the shore of Cobalt lake and is in 1000 ft. This will be used for the delivery of the ore from all the veins mentioned, except No. 86, to the concentrator to be built at the entrance. A rise is being constructed from the adit to the west drift of vein 49 which will give much needed ventilation. The shaft on vein 86 is down 75 ft. from which point drifts and crosscuts will be run to tap several veins. The Kendall shaft is down 140 ft. and a drift will be run north to tap vein 27. No. 10 shaft has reached a depth of 210 ft. at which level a crosscut is being run to vein 26, which has already been developed from the same shaft at 120 ft. and found to yield rich ore. A diamond drill is prospecting the swamp north of the Kendall vein. A shaft is being put down on the Promise vein, which is a continuation of the niccolite vein now being developed on the Cobalt-lake property. On the property north of Cobalt a shaft is down 75 ft. on the Meyer vein and a station is being cut. Another diamond drill is at work in this locality. The staff has recently been increased by 75 men, who are engaged in surface prospecting.

Mexico

CHIHUAHUA

Ronceswalles—The recent discovery of rich ore continues to attract mining men to the district near Parral. The Bien Venida and Garibaldi properties are under active development and are shipping rich ore. The ore occurs in a vein in a large dike and consists of quartz carrying very little iron. Very rich ore running 1000 oz. and more in silver is found in pockets, while practically all the quartz is said to assay about 50 oz. silver. Two or three months will be required to determine the value of the discovery.

Refugio—Three new boilers are being installed on this property in the Minas Nuevas district; unwatering will begin as soon as the machinery is in place.

Batopilas—Another of the bonanza strikes common in the history of these mines is reported from Batopilas. The shipments of silver bullion are expected to amount to 120 to 150 bars for May instead of the usual 50 bars.

Juarez—A large body of ore carrying 60 oz. of silver is reported to have been struck in this mine of the San Toy Mining Company. About 100 tons of the ore is shipped to the smeltery at Torreon daily.

Guerra al Tirano—The Oxnam Prospecting Company has ordered 10 new stamps for its 10-stamp mill near Guazapares.

Terracua Silver Mining Company—This company has been organized in Austin, Tex., to work the Los Angeles mine in Barranca Terracua about two days' ride southwest of the Creel station on the Kansas City, Mexico and Orient railroad.

GUANAJUATO

El Roble—Rich orebodies have been discovered in the adit which has been in process of driving for several months; also in winzes sunk from the adit to lower levels.

Tres Coronas—This property has developed into a producer and is building a stamp mill. The ore blocked out in the mine carries both gold and silver.

Jesus Maria—This company is increasing its cyanide-tank capacity and is running its 100-stamp mill day and night.

Ruby Tunnel—This property is shipping ore in which gold predominates. An ore shoot has been developed by a drift 120 ft. long and by a 40-ft. winze.

Pinguico—The northern workings are in remarkably rich ore. It is claimed that a body 39 in. wide will average from $8000 to $10,000 per ton.

Humboldt—This property which adjoins the Pinguico on the north has ordered machinery to sink to the 1000-ft. level in the No. 1 shaft which is near the Pinguico line.

JALISCO

Tenamache—A third vein has been cut by the main adit of these mines in the Tepic district, and machinery for a 50-ton reduction plant is to be ordered. The machinery is to be delivered at the port of San Blas. The plant will include concentrating and cyanide departments.

SONORA

Fundicion—The smelting works of the Douglas Copper Company has been in operation since May 19, and is preparing to make regular shipments of copper.

Cuba

According to Havana papers, some gold mining is going on about Holguin, in Oriente province. At the Casualidad mine a shaft is being sunk. Development work is in progress on several claims. The Santiago company, of which José Manuel Govin is president, has a shaft down 320 ft., and crosscuts are being run. This mine has already produced some gold. A custom smelter is to be erected.

Dutch East Indies

A recent British consular report gives some information as to mineral output in the year 1907, which is summed up as follows:

Gold—The Redjang Lebong mine in Borneo continues to give large returns, notwithstanding high cost of working. Two new gold mines—Sintoeroe and Moewang—were floated in 1907, but neither has reached the producing point.

Tin—Banka shipments in 1907 were: Government, 10,945 tons; private, 2432; total, 13,377 tons. This was an increase over 1906 of 1635 tons.

Petroleum—The oil business in Java is now mainly in the hands of the Bataafsche Petroleum Maatschappij, a consolidation of several of the old companies. The total production in 1907 was 1,655,331 cases, a decrease of 339,358 cases from 1906. The total for 1907 was equal to 16,553,310 gallons.

Metal, Mineral, Coal and Stock Markets

Current Prices, Market Conditions and Commercial Statistics of the Metals, Minerals and Mining Stocks

QUOTATIONS FROM IMPORTANT CENTERS

Coal Trade Review

New York, June 10—The coal trade in the West continues quiet; though a little movement is reported at some consuming centers. The rather irregular production of the past month has had little effect on the market, owing to the light demand.

In the East the bituminous trade is even more quiet than in the West, and consumers are taking little coal beyond their immediate needs, and those are not large.

The anthracite trade is also dull. Though the May shipments from mines were large, it looks as though a considerable proportion must have gone to the storage yards.

Proceedings under the commodity clause of the Interstate Commerce law—commonly known as the Hepburn act—were begun in the United States Circuit Court in Philadelphia, June 5, when bills in equity were filed against seven companies—the Central of New Jersey, the Delaware, Lackawanna & Western, the Delaware & Hudson, the Erie, the Lehigh Valley, the Pennsylvania and the Philadelphia & Reading. The complaints are all substantially the same, charging violations of the law. It is understood that there will be no dispute as to the facts in the several cases, the contention being entirely over the constitutionality of the law. Arguments will be heard about June 15 next.

Coal Traffic Notes

Tonnage originating on Pennsylvania Railroad lines east of Pittsburg and Erie, year to May 30, in short tons:

	1907.	1908.	Changes.
Anthracite	2,337,056	2,278,735	D. 58,321
Bituminous	15,638,519	13,154,336	D. 2,484,181
Coke	5,877,542	2,818,885	D. 3,058,657
Total	23,853,115	18,251,956	D. 5,601,159

The total decrease this year to date was 23.5 per cent.

The Monongahela River Consolidated Coal and Coke Company reports shipments for the six months of its fiscal year from Nov. 1 to April 30 as follows, in short tons:

	1907.	1908.	Changes.
River coal	2,447,215	2,578,674	I. 131,459
Rail coal	807,560	675,381	D. 132,179
Total	3,254,775	3,254,055	D. 720

The increase in river coal was due to the unusually long continued stage of high water in the Ohio this year.

Anthracite coal shipments for the month of May were 6,088,116 tons, an increase of 92,844 tons over May of last year; and of 100,885 tons over April. For the five months ended May 31 the shipments, by companies were, in long tons:

	1907. Tons.	1907. Per Ct.	1908. Tons.	1908. Per Ct.
Reading	5,451,068	20.2	5,173,553	19.2
Lehigh Valley	4,551,318	19.9	4,551,018	16.9
N. J. Central	3,503,635	13.0	3,609,195	13.4
Lackawanna	4,303,237	16.0	4,115,335	15.2
Del. & Hudson	2,664,918	9.9	2,784,864	10.3
Pennsylvania	2,498,216	9.2	2,619,655	9.7
Erie	2,859,568	10.6	2,958,190	11.0
N. Y., Ont. & W.	1,128,375	4.2	1,151,717	4.3
Total	26,960,335	100.0	26,963,527	100.0

Changes from last year were small. The total increase was only 3192 tons, or 0.1 per cent.

Receipts of coal at Boston, five months ended May 30, long tons:

	1907.	1908.	Changes.
Anthracite	855,862	718,818	D. 137,044
Bituminous	1,230,710	1,261,517	I. 30,807
Total domestic	2,086,572	1,980,335	D. 106,237
Foreign	222,955	196,600	D. 26,355
Total	2,309,527	2,176,935	D. 132,592

The foreign coal reported comes chiefly from Nova Scotia.

New York

Anthracite

June 10—The market is quiet and all sizes are in large supply. A number of producers are curtailing their production fully 50 per cent., because they have lacked space in which to store any more coal and because of the small demand at the present time. The Lake traffic has not yet opened, because there has been practically no shipping of iron ore or grain from the upper Lake ports. Prices are as follows: Broken, $4.45; egg, stove and chestnut, $4.70; pea, $3.25@3.50; buckwheat No. 1, $2.35@2.50; buckwheat No. 2, or rice, $1.65@2; barley, $1.35@1.50; all f.o.b. New York harbor.

Bituminous

The soft-coal market shows no more activity than it has for the last month. All consumers are reluctant to take coal and are calling for not more than one-half of their contract requirements. The mines are working about two full days per week, and at present this seems to meet all requirements. The demand which existed for slack coal a short time ago has now abated, and slack brings about 65@70c. f.o.b. mines.

In New York harbor business is at a standstill, and good grades of steam coal are offered at $2.45@2.55 with few takers. In the Coastwise vessel trade vessels are tied up in large numbers, preferring not to take the low rates of freight which are offered. Freight rates are as follows: Philadelphia to Boston, Salem and Portland, 50c.; to Newburyport, Bangor and Gardiner, 70c.; to Lynn, 65c.; to the Sound, 45@50c.; towages where usual.

Birmingham

June 8—More miners are at work now in Alabama than for several months and the coal production is increasing. Alabama district No. 20, United Mine Workers, is holding its eleventh annual convention in Birmingham this week. The organization is not as strong by a good deal as it was a few years ago. Not a single iron-making company in the district recognizes the union. A joint conference between the union miners and the operators who recognize the union will be held this week.

The production of coke has picked up, several batteries having recently been lighted up. It is understood that the Semet-Solvay By-product Company will build a number of new ovens at Ensley. A big reservoir is now being constructed at Ensley for the preservation of pitch.

Chicago

June 8—Both Western and Eastern coals are in less demand, owing to summer conditions and the abundance of all kinds of supplies, allowing consumers to pick from a wider field than for several weeks. The continued preference for low-priced coals aids Western coals of the fine kinds. There has been much coal on tracks in the last week, particularly lump, keeping prices low to avoid demurrage charges. Contract making advances here and there, but the tendency is toward relying on the open market.

Lump and egg from Illinois and Indiana mines bring $1.75@2.15, for most of that sold; run-of-mine, $1.65@1.85, and screenings, $1.40@1.60. Brazil block sells for $2.80@2.90.

Hocking is probably strongest of coals from east of Indiana, though the supply has been large; the price is $2.95@3.15. Smokeless is too plentiful and sells at 10@20c. less than the circular price of $3.30. Youghiogheny is in very light demand at $3.15@3.25 for ¾ in.

Pittsburg

June 9—Outside of heavy shipments of coal to Lake ports there is no marked increase in the demand. The railroad mines in the Pittsburg district are being

operated to a trifle over 75 per cent. of capacity, on Lake shipments exclusively, as it is impossible to handle a greater tonnage owing to the congested condition at the docks. The leading independent interest, which has no Lake contracts, is operating to full capacity. Prices remain firm on a basis of $1.15 for mine-run coal at mine and slack 75c. a ton. The river mines are operating almost to capacity.

Connellsville Coke—There is no decided change in the coke situation outside of an increased number of inquiries for both furnace and foundry coke for second-half delivery.

Prices are as follows: Furnace, spot, $1.65, on contract, $1.85@2; foundry, both spot and on contract, $2.10@2.25. While the ovens in both regions number over 37,000, less than one-third are running this week. In its weekly summary the *Courier* gives the production in both fields at 153,202 tons. The shipments were 5691 cars as follows: To Pittsburg, 1993; to points west of Connellsville, 3361; to points east, 337 cars.

Foreign Coal Trade

Imports of coal into Spain for the three months ended March 31 were 455,946 metric tons, a decrease of 77,625 tons. Imports of coke were 90,294 tons, an increase of 27,535 tons.

Coal production in Japan was 12,794,274 tons in 1906, and 13,716,488 in 1907; an increase of 922,214 tons.

Welsh Coal Trade—Messrs. Hull, Blyth & Co., London and Cardiff, report current prices at Welsh ports as follows, under date of May 30: Best Welsh steam, $3.96; seconds, $3.72; thirds, $3.60; dry coals, $3.84; best Monmouthshire, $3.42; seconds, $3.36; best small steam, $2.28; seconds, $2.10; all per long ton, f.o.b. shipping port.

Iron Trade Review

New York, June 10—The event of the week was the hastily called conference in New York, June 9. Following the reduction in iron bars last week, the general impression that other cuts must follow put an absolute stop on all new business, and something had to be done. The result of this conference is officially stated as follows:

'The representatives of the leading steel-manufacturing companies have been in session during the day. It is understood the price of iron ore has been, or will soon be, reduced 50c. per ton base.

"Each one of the steel manufacturers expressed the opinion that there should be a readjustment in the prices of their respective commodities as follows: Billets from $28 per ton to $25, Pittsburg; sheet-bars from $29 to $27 per ton Pittsburg; plates from $1.70 to $1.60 per 100 lb. Pittsburg; structural iron from $1.70 to $1.60 per 100 lb. Pittsburg; merchant pipe a reduction of two points, or $4 per ton Pittsburg; wire nails from $2.05 to $1.95 per 100 pounds.

"Sheets and tinplates were reduced early in the year, therefore no changes were considered in the prices of these products.

"It is hoped these changes will not necessitate a general or radical readjustment of wages, which it is desirous to avoid."

It is to be feared that these reductions are not radical enough to bring out new business freely, but sufficient to induce hopes of further concessions. Comments on the situation will be found on our editorial page.

It is reported that the Steel Corporation has taken large orders for rails for Canada, Russia and other foreign countries; but no positive statements can be had.

Pig Iron Production—The reports of the furnaces on June 1 show that there were on that date 141 coke and anthracite furnaces in blast, having an aggregate weekly capacity of 260,500 tons; a decrease of 8100 tons as compared with May 1. It is 261,700 tons less than on June 1, 1907. Taking the estimate of the *Iron Age* and making allowance for the charcoal furnaces, the production of pig iron in the United States in May was 1,184,000 tons; for the five months ended May 31 it was 5,758,700 tons.

Birmingham

June 9—Almost every iron manufacturer in the Southern territory has recently placed enough business to warrant a resumption of furnaces. Several furnaces have been started up or will be in blast in the next few days. The Tennessee company has started up two furnaces and before June 15 will have two more going. Open-hearth furnaces in the steel plant at Ensley were started up this week. The sales of iron during the past two weeks were numerous. There is still an interesting demand and some business, though in smaller lots, is being handled. Quotations are firm at $12 for No. 2 foundry, with $12.50 asked in some quarters. The furnace companies are not hunting business except above the $12 per ton rate.

The Bessemer rolling mills will be started next week. The cast-iron pipe plants are getting considerable business. The Central Foundry Company and the Gadsden Pipe Company plants are both in full operation again. The Shelby Iron Company will blow in a charcoal furnace at Shelby next week.

Chicago

June 8—Buying of pig iron has been fairly good and individual orders for moderate amounts have been placed over a wide field. Contracts for third quarter are in general made at $12 Birmingham ($16.35 Chicago) for No. 2, there being a range of 25c. above and below this figure. On fourth-quarter business the base price is $12.50 Birmingham with similar variation.

Northern iron, firm because of small production, sells for $17.50@18 for No. 2 foundry. Northern charcoal is limited in supply and sales, at $19.50@20.50. Some Southern iron has been sold at $11.50 Birmingham for delivery in the next 30 days. The consumer is now seeking contract rather than spot iron.

Buying of bars has been stimulated by the cut in price, and there has been some business in structural iron and railroad supplies.

Coke continues at $4.90 for the best Connellsville, with sales somewhat better, but large supplies on track.

Philadelphia

June 10—The tone of the pig-iron market continues to improve and inquiries from New England and nearer markets are increasing with sales, mostly for near-by delivery and largely for foundry irons. Prices are held firmly which is due to the sold-up conditions at Virginia and Alabama furnaces, and the steady depletion of stocks. Good No. 2X foundry is held at $16, though some grades can be had at 50c. less. Basic pig is stronger than for some time. Forge is extremely dull. Pig suitable for pipe making will be contracted for this week in large amounts.

Scrap—The increased activity in pig is reflecting favorably on scrap iron, but the volume of business is still moderate.

Pittsburg

June 9—According to information furnished by prominent steel men here the cut of $4 a ton in steel bars and the reduction of $1 a ton in iron bars making the price uniform at 1.40c., Pittsburg, announced last week, has brought out considerable new business. A general meeting of producers of finished steel is being held in New York this week at which it seems certain that prices in all lines will be reduced, and the market here is waiting. The mills are runing on an average of 50 per cent. capacity. The American Sheet and Tin Plate Company opened the week with about 92 per cent. of its tin mills going and a trifle over 50 per cent. of its sheet mills. A number of reports have been received here of heavy tonnages of steel rails to be placed by Canadian roads and by the Russian government which are under negotiation by the United States Steel Export Company, but these reports cannot be confirmed. The Jones & Laughlin Steel Company continues to operate to nearly 90 per cent. It has been learned that this company did not get the entire tonnage for the Beaver bridge, but that a portion of it has gone to the Carnegie Steel Company.

Pig Iron—The feature of the market is the closing yesterday by W. P. Snyder & Co., of a three-year contract for basic iron with the Page Woven Wire Fence Company, with works at Monessen. Some reports placed this at 150,000 tons for early delivery. The contract calls for iron ranging from about 50,000 tons to 72,000 tons, and deliveries extending three years from July 1, prices to be adjusted monthly. The company is to take a minimum of 1500 tons and a maximum of 2000 tons a month. While the contract does not take a large tonnage out of the market, it has strengthened the situation. Other sales of pig iron have been small and prices irregular. Some producers who made low rates were convinced that ore prices are to be reduced 50c. a ton. Sales of bessemer iron were in small lots, the total being 525 tons and the prices ranged from $15.45 to $16.50. The bessemer market is mixed; basic is nominal, $15.25 being quoted for third and $15.50 for fourth quarter. Foundry No. 2 iron is irregular with sales being made at $15. It is reported today that as low as $14.60 can be done. An inquiry for 5000 tons of gray forge is reported. In the absence of sales the nominal price is $14. All prices quoted are f.o.b. Valley furnaces.

Steel—There is no demand for billets. The New York State Steel Company last week offered 6000 tons at $24, Buffalo, and sold 4000 tons. The freight to Pittsburg is $1.80, making the price delivered here $25.80, or $2.20 a ton under the official price of $28, Pittsburg, but the company could not sell the other 2000 tons. While plates and shapes have been quoted at 1.70c. Pittsburg, no sales are being made. Steel bars are now quoted at 1.40c.

Sheets—There is nothing new and prices up to today remain at 2.50c. for black sheets and 3.55c. for galvanized, No. 28 gage.

Ferro-Manganese—The market continues strong; prices $46.50@47.50, Pittsburg. The largest transaction was 400 tons for deliveries running to February, 1909, at $47, Pittsburg.

Metal Market

Gold and Silver Exports and Imports

NEW YORK, June 10.
At all U. S. Ports in April and year.

Metal.	Exports.	Imports.	Excess.
Gold:			
Apr. 1908..	$14,476,341	$ 2,417,170	Exp. $12,059,171
" 1907..	2,219,844	4,974,527	Imp. 2,754,683
Year 1908..	18,335,344	19,846,243	" 1,510,899
" 1907..	7,923,148	16,621,142	" 8,697,994
Silver:			
Apr. 1908..	4,452,564	3,308,106	Exp. 1,144,458
" 1907..	4,862,998	3,970,443	" 892,455
Year 1908..	17,038,851	14,138,762	" 2,900,089
" 1907..	19,532,394	15,355,969	" 4,176,425

Exports from the port of New York, week ended June 6: Gold, $1,798,000, chiefly to Germany; silver, $1,311,880, principally to London. Imports for the week: Gold, $115,680, from South and Central America; silver, $49,793 from the West Indies and Mexico.

Specie holdings of the leading banks of the world June 6, are reported, as below, in dollars:

	Gold.	Silver.	Total.
Ass'd New York	.....	.....	$295,945,300
England	$190,991,015	.....	190,991,015
France	613,584,615	$182,805,820	796,390,435
Germany	172,375,000	71,435,000	243,810,000
Spain	77,910,000	133,475,000	210,385,000
Netherlands	38,503,000	20,980,500	59,483,500
Belgium	20,256,665	10,128,335	30,385,000
Italy	181,615,000	21,975,000	203,590,000
Russia	561,335,000	37,915,000	599,250,000
Aust.-Hungary	233,790,000	66,675,000	300,465,000
Sweden	19,455,000	.....	19,455,000
Norway	7,610,000	.....	7,610,000
Switzerland	17,125,000	.....	17,125,000

The New York banks do not separate gold and silver. The foreign statements are from the *Commercial and Financial Chronicle* of New York.

Silver Market

SILVER AND STERLING EXCHANGE.

June.	Sterling Exchange.	Silver. New York, Cents.	Silver. London, Pence.	June.	Sterling Exchange.	Silver. New York, Cents.	Silver. London, Pence.
4	4.8700	52⅝	24¼	8	4.8690	52⅞	....
5	4.8700	52⅞	24⅜	9	4.8690	53	24⅞
6	4.8695	52⅞	24⅜	10	4.8690	53⅛	24½

New York quotations are for fine silver, per ounce Troy. London prices are for sterling silver, 0.925 fine.

Messrs. Pixley & Abell report silver shipments from London to the East for the year to May 30:

	1907.	1908.	Changes.
India	£5,257,534	£3,172,218	D. £2,085,316
China	.....	516,400	I. 516,400
Straits	491,862	90,200	D. 401,662
Total	£5,749,396	£3,778,818	D. £1,970,578

Receipts for the week were £136,000 from New York. Exports were £89,000 to India.

Copper, Tin, Lead and Zinc

DAILY PRICES OF METALS.

June.	Copper. Lake, Cts. per lb.	Copper. Electrolytic, Cts. per lb.	Copper. London, £ per ton.	Tin. Cts. per lb.	Lead. Cts. per lb.	Spelter. New York, Cts. per lb.	Spelter. St. Louis, Cts. per lb.
—	12¾ @12⅞	12¾ @12⅞	58 1/16	28½	4.37½ @4.42½	4.62½ @4.67½	4.47½ @4.52½
5	12¾ @12⅞	12¾ @12⅞	58¼	28⅜	4.42½ @4.47½	4.60 @4.65	4.45 @4 50
6	12⅜ @12⅞	12⅜ @12⅞	.....	28¼	4.42½ @4.47½	4.62½ @4.67½	4.47½ @4.52½
8	12¾ @13	12¾ @12⅞	.....	28	4.47½ @4.50	4.60 @4.65	4.45 @4.50
9	12⅞ @13	12⅞ @12⅞	58¼	28¼	4.47½ @4 50	4.57½ @4.62½	4.42½ @4.47½
10	12⅞ @13	12⅞ @12⅞	58½	28⅜	4.47½ @4.52½	4.57½ @4.60	4.42½ @4.45

London quotations are per long ton (2240 lb.) standard copper, which is now the equivalent of the former g.m.b's. The New York quotations for electroytic copper are for cakes, ingots or wirebars, and represent the bulk of the transactions made with consumers, basis, New York, cash. The price of cathodes is 0.125c. below that of electrolytic. The quotations for lead represent wholesale transactions in the open market. The quotations on spelter are for ordinary Western brands; special brands command a premium.

Copper—The market continued dull up to June 8, when there was a revival in demand, and considerable transactions have since been made, both with foreign and with domestic consumers, and both in Lake and in electrolytic copper. There have been several million-pound sales to domestic consumers, and the aggregate of the business has been a noteworthy improvement over previous stagnation. This has led to a small advance in prices, but electrolytic is still freely offered at 12⅞, delivered, 30 days, or about 12¾c., cash, New York, while some of the export business nets slightly less.

On the whole it may be said that sentiment has experienced a distinct improvement during the week. Though domestic manufacturers are not yet running full time, business from this quarter is well maintained. At the same time, the export demand has developed more activity, particularly during the last three days. This is the more encouraging because the visible supply abroad has been increasing right along, but it must be borne in mind that there are no significant stocks on this side of the water. The market closes firm and higher at 12⅞@13c. for Lake copper; 12⅝@12¾c. for electrolytic in ingots, cakes and wirebars. The average of the week for casting copper is 12⅜@12½ cents.

It is reported from London that the general public is taking a lively interest in the copper market and believes in holding warrants practically as an investment at the ruling prices. Increased buying orders caused an advance at the cluose to £58 10s. for spot, £58 18s. 9d. for three months.

Refined and manufactured sorts we quote: English tough, £60 10s.@£61 10s.; best selected, £60 10s.@61 10s.; strong sheets, £72 10s.@£73 10s.

Manufactured Copper—Sheets, cold-rolled, 18c.; hot-rolled, 17c. Wire, 14¾c. base.

Tin—Up to Monday of this week the market, both here and in London, showed a rather weak tendency. Since yesterday, however, there has been a better feeling prevalent, and the domestic market advanced in sympathy with that in London. The low point reached in London was £128 5s. for spot and three months, but the close is cabled firm at £128 17s. 6d. for spot, £129 5s. for three months. In our market the premium on spot tin has entirely disappeared, and sales have been made around 28⅜@28½ cents.

Lead—There has been a lively demand at advancing prices, and the close is firm at 4.47½@4.52½ New York.

The London market has been sluggish and closes lower at £12 10s. for Spanish lead, £12 12s. 6d. for English lead.

Spelter—The low prices ruling for this metal have at last attracted consumers, and in the early part of the week they placed heavy orders. Speculators assumed that the turn had finally come and for a day or two drove the market up at a rapid pace. The movement, however, appears to

have petered out and prices close lower at 4.42½@4.45c. St. Louis, 4.57½@4.60c. New York.

The London market is weak and at the close is quoted lower at £19 2s. 6d. for good ordinaries, £19 7s. 6d. for specials.

Other Metals

Antimony—The market, both in New York and abroad, is dull, and without interest. Quotations are 8¾@9c. for Cookson's, 8½@8¾c. for Hallett's, and 8@8¼c. for ordinary brands.

Aluminum—Ingots, American No. 1, in large quantities, 33c. per lb. Rods and wire, 38c. base; sheets, 40c. base. Foreign metal is offered at rather lower prices.

Nickel—According to size of lot and terms of sale, 45@50c., New York.

Quicksilver—New York, $45 per flask. San Francisco, large lots nominal at $44.50, domestic, and $43, export; small orders, $45@46. London, £8 5s.

Platinum—Continued dullness caused a decided break in the market, bringing prices to $23.50 per ounce for hard platinum, $21 for ordinary and $16 for scrap.

Imports and Exports of Metals

Exports and imports of metals in the United States for the four months ended April 30 are reported as follows, in the measures usual in the trade:

	Exports.	Imports.	Balance.
Copper, long tons	124,406	27,219	Exp. 97,187
Copper, 1907	54,505	42,589	Exp. 11,916
Tin, long tons	100	10,518	Imp. 10,418
Tin, 1907	122	14,623	Imp. 14,501
Lead, short tons	26,832	37,768	Imp. 10,936
Lead, 1907	8,347	25,579	Imp. 17,232
Spelter, sh. tons	1,167	267	Exp. 900
Spelter, 1907	250	414	Imp. 164
Nickel, lb.	4,341,453	4,807,773	Imp. 466,320
Nickel, 1907	3,901,489	6,590,579	Imp. 2,689,090
Antimony, lb.	.....	2,624,131	Imp. 2,624,131
Antimony, 1907	.....	3,671,297	Imp. 3,671,297
Platinum, lb.	.....	946	Imp. 946
Platinum, 1907	.....	2,817	Imp. 2,817
Quicksilver, lb.	81,488	.....	Exp. 81,488
Quicksilver, '07	183,562	.....	Exp. 183,562
Aluminum, value	$137,316	.....	Exp. $137,416
Aluminum, 1907	112,514	.....	Exp. 112,514

Copper, lead and nickel include the metal contents of ores, matte, bullion, etc. Zinc ores exported were 8071 tons in 1907, and 10,118 in 1908; zinc dross, 8,725,377 lb. in 1907, and 9,077,787 lb. in 1908. Zinc ores imported this year, 5104 tons calamine and 5797 other ores; 10,901 tons in all; not reported in 1907. Antimony ores imported, 937,451 lb. 1907, and 306,203 lb. in 1908. Exports given above include re-exports of foreign material.

Missouri Ore Market

Joplin, Mo., June 6—The highest price paid for zinc ore was $37; the assay price $31@34 per ton of 60 per cent. zinc. Prices of all grades averaged $32.38 per ton. The highest price paid for lead was $61.50 for one carload, the bulk of the shipment being at $58@60, and averaging, all grades, $58.80 per ton.

Two things occurred during the week in the zinc market to cause interest: A smelting firm, in which a leading New York spelter brokerage firm is supposed to direct the ore-purchasing department, purchased several thousand tons of zinc ore at a slight advance over the low point of the week. The other was the starting of a rumor that a movement was on foot to export from 5000 to 10,000 tons of zinc ore from the district. The heavy purchases of the smelting company just mentioned will prevent a possibility of contracting more than 6000 or 7000 tons for export, but this would clean up all the existing reserve stock.

Following are the shipments of ores for the week ending June 6:

	Zinc, lb.	Lead, lb.	Value.
Webb City-Carterville	2,436,790	1,164,820	$75,241
Joplin	1,647,920	643,280	45,900
Galena	977,650	65,320	17,600
Alba-Neck	974,420	20,880	17,191
Prosperity	446,780	218,530	13,926
Duenweg	560,410	38,800	10,410
Oronogo	403,930	67,290	8,656
Badger	368,740	.....	6,084
Miami	368,740	122,620	5,673
Granby	268,640	17,590	3,760
Quapaw-Baxter	65,000	43,210	2,271
Zincite	114,740	.....	1,778
Sarcoxie	75,570	.....	1,209
Carthage	61,090	.....	1,038
Cave Springs	64,610	.....	1,034
Spurgeon	83,960	6,500	1,032
Totals	8,736,360	2,408,840	$212,803
23 weeks	209,046,060	31,775,450	$4,415,641

Zinc value, the week, $141,843; 23 weeks, $3,590,841
Lead value, the week, 70,960; 23 weeks, 824,800

Average ore prices in the Joplin market were, by months:

ZINC ORE AT JOPLIN.			LEAD ORE AT JOPLIN.		
Month.	1907.	1908.	Month.	1907.	1908.
January	45.84	35.56	January	83.58	46.88
February	47.11	34.92	February	84.58	49.72
March	48.66	34.19	March	82.75	49.90
April	48.24	34.08	April	79.76	52.47
May	45.98	33.39	May	79.56	56.05
June	44.82	.....	June	73.66	.....
July	45.79	.....	July	58.18	.....
August	43.22	.....	August	59.54	.....
September	40.11	.....	September	53.52	.....
October	39.83	.....	October	51.40	.....
November	35.19	.....	November	43.40	.....
December	30.87	.....	December	37.71	.....
Year	43.68	.....	Year	68.90	.....

Wisconsin Ore Market

Platteville, Wis., June 6—The highest price paid for zinc ore this week was $36; the base price is lower again, $32@34 per ton of 60 per cent. zinc. Lead ore, on the other hand, is higher, the best grades bringing $58 per ton.

The ore shipment is unusually high again this week, but a sharp falling off will most likely result within the next few weeks; discouraged by the untoward market conditions, several companies have closed down and others are expected to close soon. The producers at Platteville, recently merged into one company by Eastern interests, were closed down this week pending the final transfers; it is expected that these mines will be reopened soon.

Ore shipments, week ended June 6, were:

Camps.	Zinc ore, lb.	Lead ore, lb.	Sulphur ore, lb.
Platteville	604,060	.....	.....
Hazel Green	593,700	.....	.....
Benton	339,020	81,250	.....
Cuba City	303,340	85,000	.....
Mineral Point	256,200	.....	.....
Strawbridge	256,100	60,000	.....
Livingston	250,000	.....	.....
Dubuque	180,000	.....	.....
Elmo	173,250	.....	.....
Days Siding	88,000	.....	.....
Galena	84,400	.....	.....
Dodgeville	80,000	.....	.....
Highland	64,450	.....	.....
Linden	46,290	60,130	.....
Total	3,318,810	306,380	.....
Year to June 6	36,198,225	3,611,405	125,820

In addition to the above there was shipped to the electrostatic separator at Platteville, from Days Siding, 165,000 lb.; from Strawbridge, 93,900 lb.; and from Benton, 303,100 lb. of zinc concentrates during the week.

Chemicals

New York, June 10—The general situation remains unchanged. Sales and shipments upon contracts have not been important.

Arsenic—There has been considerable competition, resulting in lower prices. Spot arsenic has been offered as low as 3⅝c., but the prevailing quotations are 3¾@4¼c. per pound.

Copper Sulphate—The demand shows some improvement and several carloads have been disposed of. Standard makes are held firmly at $4.65 per 100 lb. for carloads and $4.90 for smaller quantities.

Exports of copper sulphate from the United States for the four months ended April 30 were 5,423,397 lb. in 1907, and 6,155,502 lb. in 1908; an increase of 732,105 lb. this year.

Nitrate of Soda—No change occurred in the market. Business is quiet and prices remain firm.

Sulphur—Imports of sulphur and pyrites into the United States, four months ended April 30, long tons:

	1907.	1908.	Changes.
Sulphur	4,403	11,818	I. 7,415
Pyrites	211,671	243,433	I. 31,762
App. total sulphur	89,071	109,191	I. 20,120

Exports of sulphur for the four months were 1974 tons in 1907, and 2682 in 1908; increase, 708 tons.

Phosphates—Exports of phosphates, four months ended April 30, long tons:

	1907.	1908.	Changes.
Crude and rock	313,885	410,317	I. 96,432
All other	10,902	9,840	D. 1,062
Total	324,787	420,157	I. 95,370

The larger exports this year were to Germany, Great Britain and France.

Heavy Chemicals—Imports of heavy chemicals into the United States, four months ended April 30, in pounds:

	1907.	1908.	Changes.
Bleaching powder	40,332,328	25,034,255	D. 15,298,073
Potash salts	73,449,960	50,904,996	D. 22,544,964
Soda salts	7,995,063	3,967,169	D. 4,027,894

Exports of acetate of lime were 34,637,897 lb. in 1907, and 21,763,898 lb. in 1908; a decrease of 12,873,999 lb. this year.

Mining Stocks

New York, June 10—The general stock markets have been irregular and confused, with no definite tendency, and closed rather dull. Crop reports are favorable and other indications point to improvement, but they had no visible effect on the stock quotations.

The curb market has been generally rather dull through the week. In the copper stocks fluctuations were small and irregular. North Butte Extension, which has recently been traded in, broke to 12½c. per share on an offer of a block of 25,000 shares, which was taken at that price. The Cobalt stocks were a little more active than the copper.

Boston

June 9—The Boston market has been comparatively quiet. Rather narrow and irregular for some days, it broadened out a little toward the close, and prices at the end were fairly steady. Amalgamated wound up at $66.50, after touching $67. Calumet & Hecla recorded a sale today at $675; Calumet & Arizona brought $108.75, and Copper Range $71. Atlantic sold around $16, and Osceola at $90. Utah Consolidated was quoted at $41.50, and North Butte closed at $66.25. None of the sales were in large blocks, however. Victoria closed at $5.25, and was less of a specialty than last week.

Conditions favoring speculation—such as the easy money market, good crop reports and reviving business—seem to have little effect on stocks.

STOCK QUOTATIONS

NEW YORK	June 9	BOSTON	June 9
Name of Comp.	Clg.	Name of Comp.	Clg.
Alaska Mine	7/16	Adventure	2
Amalgamated	66½	Allouez	‡27
Anaconda	42¼	Am. Zinc	29½
Balaklala	1	Arcadian	‡3⅛
British Col. Cop.	5	Arizona Com	17
Butte & London		Atlantic	16
Butte Coalition	23¼	Bingham	‡.65
Colonial Silver	½	Boston Con	11½
Cum. Ely Mining	7⅞	Calumet & Ariz	108¾
Davis Daly	2¾	Calumet & Hecla	675
Dominion Cop.	1 7/16	Centennial	22
Douglas Copper	3¾	Con. Mercur	.40
El Rayo	2⅛	Copper Range	71
Florence	3½	Daly West	10½
Foster Cobalt	1	Franklin	9
Furnace Creek	.14	Greene-Can.	9⅞
Giroux	5	Isle Royal	‡19½
Gold Hill	9/16	La Salle	14
Goldfield Con.	5⅜	Mass	‡3
Granby	102	Michigan	8½
Greene Gold	3/4	Mohawk	59
Greene G. & S	⅛	Nevada	12
Greenw'r & D.Val.	.75	North Butte	66¼
Guanajuato	2¼	Old Colony	‡.50
Gnggen. Exp.	150	Old Dominion	34
Hanapah	‡.20	Osceola	90
McKinley Dar	74	Parrot	21½
Micmac	3⅝	Quincy	‡90
Mines Co. of Am.	1 1/16	Rhode Island	‡3⅛
Mitchell Mining	½	Santa Fe	‡1¾
Mont. Sho.C	1 3/16	Shannon	13¾
Nev. Utah M. & S.	3 7/16	Superior	17¼
Newhouse M. & S.	6⅜	Tamarack	‡58
Nipissing Mines	7⅜	Trinity	13
Old Hundred	5	United Cop., com.	6¾
Silver Queen	1.08	U. S. Oil	26
Stewart	¾	U. S. Smg. & Ref.	37½
Tennessee Cop'r.	37	U.S.Sm. & Re.,pd.	41¾
Tri-Bullion	1 1/16	Utah Con	41¾
Union Copper	¾	Victoria	5¼
Utah Apex	4	Winona	6
Utah Copper	30⅝	Wolverine	134
Yukon Gold	3⅞	Wyandotte	‡1

*Ex. Div. †Ex. Rights. ‡Last quotation.

N. Y. INDUSTRIAL	
Am. Agri. Chem	23
Am. Smelt. & Ref.	75
Am. Sm. & Ref., pf.	99⅛
Bethlehem Steel	‡15
Colo. Fuel & Iron	27⅜
Federal M. & S.,pf.	‡74½
Inter. Salt	18½
National Lead	67⅜
National Lead, pf.	99¾
Pittsburg Coal	13
Republic I. & S.	17⅜
Republic I. & S.,pf.	67
Sloss-Sheffield	50¾
Standard Oil	600
U. S. Red. & Ref.	‡9¾
U. S. Steel	37½
U. S. Steel, pf	101¼
Va. Car. Chem	24

BOSTON CURB	
Ahmeek	‡70
Black Mt.	4¼
East Butte	6¾
Hancock Con	‡4¼
Keweenaw	6½
Majestic	.68
Raven	1 1/16
Shawmut	.35
Superior & Pitts	12⅝
Troy Man	.40

ST. LOUIS	June 6	
N. of Com.	High.	Low.
Adams	.30	.20
Am. Nettie	.03	.02
Center Cr'k	2.00	1.50
Cent. C. & C.	69.00	67.00
C.C. & C. pd.	77.00	75.00
Cent. Oil	110.00	100.00
Columbia	4.00	3.00
Con. Coal	15.00	12.00
Doe Run	125.00	110.00
Gra. Bimet.	.18	.12
St. Joe	15.00	12.50

LONDON	June 10		
Name of Com.	Clg.		
Dolores	£1	5s	0d
Stratton'sInd.	0	1	9
Camp Bird	0	13	0
Esperanza	1	10	0
Tomboy	1	13	9
El Oro	1	4	6
Oroville	0	11	0

Cabled through Wm. P. Bonbright & Co., N. Y.

NEVADA STOCKS. June 10.
Furnished by Weir Bros. & Co., New York.

Name of Comp.	Clg.	Name of Comp.	Clg.
COMSTOCK STOCKS		Silver Pick	.15
Belcher	.21	St. Ives	.27
Best & Belcher	.56	Triangle	.03
Caledonia	.09	BULLFROG STOCKS	
Challar	.09	Bullfrog Mining	.03
Comstock	‡.39	Bullfrog Nat. B	.05
Con. Cal. & Va	.58	Gibraltar	.05
Crown Point	.35	Gold Bar	.05
Exchequer	.21	Homestake King	.29
Gould & Curry	.15	Montgomery Mt.	.06
Hale & Norcross	.30	Mont. Shoshone C.	.81½
Mexican	.51	Original Bullfrog	.01½
Ophir	2.82½	Tramp Cons	.16
Overman	.05	MANHAT'N STOCKS	
Potosi	.12	Manhattan Cons.	.09
Savage	.35	Manhat'n Dexter	.05
Sierra Nevada	.23	Jumping Jack	.04
Union	.29	Stray Dog	.03
Utah	.02	MISCELLANEOUS	
Yellow Jacket	.70	Golden Boulder	.06
TONOPAH STOCKS		Bonnie Clare	.06
Belmont	.75	Lee Gold Grotto	...
Extension	.80	Nevada Hills	1.87½
Golden Anchor	‡.02	Nevada Smelting	1.00
Jim Butler	.23	Pittsburgh S. Pk.	1.13
MacNamara	.30	Round Mt. Sphinx	.26
Midway	.35		
Montana	1.40		
North Star	.06		
Tono'h Mine of N.	8.25		
West End Con	.40		
GOLDFI'D STOCKS			
Adams	.03		
Atlanta	.17		
Booth	.16		
Columbia Mt	.15		
Comb. Frac	.45		
Cracker Jack	.05		
Dia'dfield B. B. C.	.16		
Goldfield Belmont	.14		
Goldfield Daisy	.89		
Great Bend	.24		
Jumbo Extension	.24		
Katherine	...		
Kendall	.15		
Lone Star	.06		
May Queen	.05		
Oro	.08		
Red Hill	.17		
Roanoke	...		
Sandstorm	.22		

COLO. SPRINGS	June 6		
Name of Comp.	Clg.		
Acacia	‡6		
Black Bell	....		
C. C. Con	3¼		
Dante	7¾		
Doctor Jack Pot	‡7		
Elkton	58½		
El Paso	36		
Findlay	22		
Gold Dollar	5¾		
Gold Sovereign	3½		
Isabella	34½		
Index	....		
Jennie Sample	‡3		
Jerry Johnson	....		
Mary McKinney	23		
Pharmacist	‡3¼		
Portland	1.01½		
Un. Gold Mines	‡4⅜		
Vindicator	84		
Work	9½		

Assessments

Company.	Delinq.	Sale.	Amt.
Andes, Nev.	Apr. 23	May 15	$0.10
Belcher, Nev.	Apr. 29	May 20	0.10
Big Creek, Ida.	Apr. 17	May 16	0.01
Brunswick Con., Cal.	May 27	June 26	0.03
Butler-Liberal, Utah.	Apr. 25	May 13	0.02
Century, Utah.	Apr. 14	May 14	0.02
Charm, Utah.	Apr. 31	May 13	0.01
Federal	Apr. 25	May 18	0.05
Jenny Lind, Cal.	May 11	May 28	0.05
New Red Wing, Utah.	May 2	May 19	0.01
New Stockton, Utah.	May 11	June 1	0.01
Old Evergreen	Apr. 14	May 14	0.02
Oro Cobre, Cal.	Apr. 17	May 16	0.02
Posey Canyon, Cal.	Apr. 28	May 16	0.10
Potosi, Nev.	Apr. 20	May 3	0.02½
Wabash, Utah.	May 9	June 1	0.10
Washakie-Nev., Nev.	Apr. 20	May 7	0.15
Western Mines, Nev.	Mar. 16	Apr. 23	0.01½
Zeibright, Cal.	May 12	June 1	0.05

Monthly Average Prices of Metals

AVERAGE PRICE OF SILVER

Month.	New York.		London.	
	1907.	1908.	1907.	1908.
January	68.673	55.678	31.769	25.738
February	68.835	56.000	31.852	25.855
March	67.519	55.365	31.325	25.570
April	65.462	54.505	30.253	25.133
May	65.981	52.795	30.471	24.377
June	67.090	.....	30.893	.....
July	68.144	.....	31.366	.....
August	68.745	.....	31.637	.....
September	67.792	.....	31.313	.....
October	62.435	.....	28.863	.....
November	58.677	.....	27.154	.....
December	54.565	.....	25.362	.....
Year	65.327	.....	30.188	.....

New York, cents per fine ounce; London, pence per standard ounce.

AVERAGE PRICES OF COPPER

	NEW YORK.				LONDON.	
	Electrolytic		Lake.			
	1907.	1908.	1907.	1908.	1907.	1908.
January	24.404	13.726	24.825	13.901	106.739	62 386
February	24.869	12.905	25.236	13.098	107.356	58.786
March	25.065	12.704	25.560	12.875	106.594	58.761
April	24.224	12.743	25.260	12.928	98.625	58.331
May	24.048	12.598	25.072	12.788	102.375	57.387
June	22.665	.....	24.140	.....	97.272	.....
July	21.130	.....	21.923	.....	95.016	.....
August	18.356	.....	19.255	.....	79.679	.....
September	15.565	.....	16.047	.....	68.375	.....
October	13.169	.....	13.551	.....	60.717	.....
November	13.391	.....	13.870	.....	61.226	.....
December	13.163	.....	13.393	.....	60.113	.....
Year	20.004	.....	20.661	.....	87.007	.....

New York, cents per pound. Electrolytic is for cakes, ingots or wirebars. London, pounds sterling, per long ton, standard copper.

AVERAGE PRICE OF TIN AT NEW YORK

Month.	1907.	1908.	Month.	1907.	1908.
January	41.548	27.380	July	41.091	.....
February	42.102	28.978	August	37.667	.....
March	41.313	30.577	September	36.689	.....
April	40.938	31.702	October	32.620	.....
May	43.149	30.015	November	30.833	.....
June	42.120	.....	December	27.925	.....
			Av. year	38.166	.....

Prices are in cents per pound.

AVERAGE PRICE OF LEAD

Month.	New York.		London.	
	1907.	1908.	1907.	1908.
January	6.000	3.691	19.828	14.469
February	6.000	3.725	19.531	14.250
March	6.000	3.838	19.703	13.975
April	6.000	3.993	19.975	13.469
May	6.000	4.253	19.688	12.938
June	5.760	.....	20.188	.....
July	5.288	.....	20.350	.....
August	5.250	.....	19.063	.....
September	4.813	.....	19.775	.....
October	4.750	.....	18.531	.....
November	4.376	.....	17.281	.....
December	3.658	.....	14.500	.....
Year	5.325	.....	19.084	.....

New York, cents per pound. London, pounds sterling per long ton.

AVERAGE PRICE OF SPELTER

MONTH.	New York.		St. Louis.		London.	
	1907.	1908.	1907.	1908.	1907.	1908.
January	6.732	4.513	6.582	4.363	27.125	20.563
February	6.814	4.788	6.664	4.638	25.938	20.875
March	6.837	4.665	6.687	4.527	26.094	21.075
April	6.685	4.645	6.535	4.495	25.900	21.344
May	6.441	4.608	6.291	4.458	25.563	19.906
June	6.419	.....	6.269	.....	25.469	.....
July	6.072	.....	5.922	.....	23.850	.....
August	5.701	.....	5.551	.....	21.969	.....
September	5.236	.....	5.086	.....	21.050	.....
October	5.430	.....	5.280	.....	21.781	.....
November	4.925	.....	4.775	.....	21.438	.....
December	4.254	.....	4.104	.....	20.075	.....
Year	5.962	.....	5.812	.....	23.771	.....

New York and St. Louis, cents per pound. London in pounds sterling per long ton.

Metal and Mining Companies—U. S.

Name of Company and Location.		Author-ized Capital	Shares. Issued.	Par Val.	Dividends. Total to Date.	Latest. Date.	Amt.
Alaska Mexican, g.	Al'ka	$1,000,000	180,000	$ 5	$1,896,381	Apr. 1908	$ .50
Alaska Treadwell,g.	Al'ka	5,000,000	200,000	25	9,935,000	Apr. 1908	.75
Alaska United, g.	Al'ka	1,000,000	180,200	5	333,370	Jan. 1908	.15
Amalgamated, c.	Mont	155,000,000	1,630,879	100	56,718,304	May 1908	.50
Am.Sm.&Ref.,com.	U. S.	50,000,000	500,000	100	13,625,000	July 1908	1.00
Am. Sm. & Ref. pf.	U. S.	50,000,000	500,000	100	27,961,053	July 1908	1.75
Am. Smelters, pf. A	U. S.	17,000,000	170,000	100	2,705,000	June 1908	1.50
Am. Smelters. pf. B	U. S.	30,000,000	300,000	100	4,500,000	June 1908	1.25
Am.Zinc,Lead&Sm.	Kan.	3,750,000	80,000	25	280,000	Nov. 1907	.50
Anaconda,c.	Mont	30,000,000	1,200,000	25	39,650,000	Apr. 1908	.50
Arizona, c	Ariz	3,775,000	8,682,520	.....	6,182,361	Apr. 1906	.05
Atlantic, c	Mich	2,500,000	100,000	25	990,000	Feb. 1905	.02
Bald Butte, g. s.	Mont	250,000	250,000	1	1,354,648	Oct. 1907	.04
Beck Tunnel, g.s.l.	Utah	100,000	1,000,000	0.10	675,000	Oct. 1907	.02
Bingham & N.H.,c.g	Utah	2,000,000	225,000	5	22,600	Sept. 1906	.10
Boston & Montana.	Mont	3,750,000	150,000	25	49,675,000	Apr. 1908	3.00
Bull.Beck.&Cham.g	Utah	1,000,000	100,000	10	2,688,400	Apr. 1907	.10
Bunker Hill & Sull.	Ida	3,000,000	300,000	10	10,221,000	June 1908	.25
Butte Coalition,c.s.	Mont	15,000,000	1,000,000	15	2,450,000	Dec. 1907	.15
Calumet & Arizonac	Ariz	2,500,000	200,000	10	9,500,000	Apr. 1908	1.00
Calumet & Hecla,c.	Mich	2,500,000	100,000	25	106,850,000	June 1908	5.00
Camp Bird, g., s.	Colo	5,500,000	820,000	5	5,229,673	Mar. 1908	.48
Carisa, c.g.	Utah	500,000	500,000	1	55,000	Nov. 1906	.01
Colorado, l. g. s.	Utah	200,000	1,000,000	0.20	670,000	Jan. 1908	.05
Columbus Con. c.	Utah	1,500,000	283,540	5	226,832	Oct. 1907	.20
Combi'tion Co.G'f'd	Nevada	400,000	320,000	1	688,000	Sept. 1906	.15
Con. Mercur, g.	Utah	1,000,000	1,000,000	1	3,385,313	Dec. 1906	.02½
Continental, z.l.	Mo	550,000	22,000	25	220,000	Oct. 1907	.50
Copper Range Con.	Mich	38,500,000	383,781	100	7,245,363	June 1908	1.00
Creede United, g.	Colo	2,000,000	1,625,000	1	214 063	July 1906	.00½
Daly Judge, g. s. l.	Utah	300,000	300,000	1	225,000	Apr. 1907	.37½
Daly West, g. s. l.	Utah	3,600,000	180,000	20	5,877,000	Dec. 1907	.30
De Lamar, g. s.	Ida	400,000	67,180	5	2,926,370	May 1905	.72
Dillon, g.	Colo	1,250,000	1,250,000	1	21,875	July 1905	.01
Doctor Jack Pot.	Colo	3,000,000	3,000,000	1	277,000	June 1906	.00½
Doe Run, l.	Mo	10,000,000	59,062	100	1,523,631	Mar. 1908	.50
Elkton Con., g.	Colo	3,000,000	2,500,000	1	2,079,461	Apr. 1908	.01½
El Paso, g.	Colo	2,500,000	2,450,000	1	1,022,750	June 1906	.01
Fed. Sm., com.	Idaho	10,000,000	60,000	100	2,618,750	May 1908	1.50
Federal Sm., pf.	Idaho	20,000,000	120,000	100	3,701,250	May 1908	1.75
Findley, g.	Colo	1,250,000	1,250,000	1	337,500	Sept. 1906	.01
Florence, g.	Nevada	1,250,000	1,050,000	1	216,000	Apr. 1908	.10
Frances-Mohawk,g	Nevada	1,000,000	910,000	1	410,000	Jan. 1908	.05
Gemini-Keystone	Utah	500,000	5,000	100	1,950,000	July 1907	10.00
Gold King Con	Colo	5,750,370	5,750,370	1	1,407,504	May 1905	.01
Goldfield Con., g.	Nevada	50,000,000	5,000,000	10	1,000,000	Nov. 1907	.10
Grand Central, g.	Utah	250,000	250,000	1	1,333,000	Oct. 1907	.05
Gwin Mine, Dev., g.	Cal	1,000,000	100,000	10	496,000	Apr. 1906	.05
Hecla, s. l.	Idaho	250,000	1,000,000	0.25	1,560,000	Apr. 1908	.01
Homestake, g.	S. D.	22,000,000	218,400	100	22,750,040	May 1908	.50
HornSilver,g.s.c.z.l	Utah	10,000,000	400,000	25	5,642,000	Sept. 1907	.05
Inter'l Nickel, pf.	N. Y.	12,000,000	89,126	100	1,336,890	May 1908	1.50
Iron Silver	Colo	10,000,000	500,000	20	4,100,000	Oct. 1907	.10
Jamison, g.	Cal	3,900,000	390,000	10	301,870	Apr. 1908	.02
Jerry Johnson.	Cal	2,500,000	2,500,000	1	86,700	Jan. 1908	.01
Kendall, g.	Mont	2,500,000	500,000	5	1,205,000	Feb. 1908	.02
Liberty Bell,g. s.	Colo	700,000	130,551	5	130,440	Jan. 1907	.15
Lightner, g.	Cal	125,000	102,255	1	253,081	Oct. 1906	.05
Lower Mammoth, g	Utah	190,000	190,000	1	42,750	Aug. 1907	.07½
Mammoth, g. s. l.	Utah	10,000 000	400,000	2.50	2,220,000	Mar. 1908	.05
Mary McKinney, g.	Colo	1,500,000	1,304,252	1	801,765	Apr. 1907	.03
May Day, g. s. l.	Utah	800,000	800,000	1	70,010	Oct. 1907	.01½
Mohawk, c.	Mich	2,500,000	100,000	25	1,400,000	July 1907	5.00
Mont. Ore Purch.	Mont	2,500,000	80,333	25	9,437,274	Jan. 1907	15.00
Nevada Hills, s.g.	Nevada	5,000,000	746,000	5	373,000	Dec. 1907	.10
New Century, z., l.	Mo	300,000	300,000	1	230,300	Aug. 1907	.00½
Newhouse M. & S.c.	Utah	6,000,000	600,000	10	300,000	Sept. 1907	.50
New Idria, q	Cal	500,000	100,000	5	990,000	Apr. 1908	.30
New Jersey Zinc	U. S.	10,000,000	100,000	100	12,000,000	May 1908	4.00
North Butte	Mont	6,000,000	400,000	15	5,600,000	June 1908	1.00
North Star, g.	Cal	2,500,000	250,000	10	1,599,489	Mar. 1908	.25
Old Dominion, c.	Ariz	8,750,000	293,245	25	574,088	Aug. 1907	1.00
OldDominion,M&Sc	Ariz	5,000,000	162,000	25	202,500	Aug. 1907	1.25
Old Gold	Colo	2,101,150	2,101,150	1	10,506	Mar. 1906	.05
Ophir, g. s.	Nevada	302,400	100,800	3	1,806,280	May 1908	.10
Osceola, c.	Mich	2,500,000	96,150	25	7,035,650	July 1907	7.00
Parrot, c,s.	Mont	2,300,000	229,850	10	6,807,649	Sept. 1907	.25
Pennsylvania, g.	Cal	5,150,000	51,500	100	284,925	July 1906	.10
Pitts. L. & Z., l.z.	Mo	1,000,000	1,000,000	1	20,000	July 1907	.02
Portland, g.	Colo	3,000,000	3,000,000	1	7,876,080	Apr. 1908	.04
Quartette, g. s.	Nevada	1,000,000	100,000	10	375,000	July 1907	.20
Quincy, c	Mich	3,750,000	110,000	25	18,230,000	June 1908	1.00
Rocco Homest'k,l.s.	Nevada	300,000	300,000	1	112.000	Dec. 1905	.02
Sacramento, g, q.	Utah	1,000,000	1,000,000	1	258,000	Nov. 1906	.00½
St. Joseph, l.	Mo	20,000,000	1,000,000	10	5,858,357	June 1908	.15
Silver Hill, g. s	Nevada	108,000	108,000	1	81,000	June 1907	.05
Silver King, g. s. l†	Utah	3,000,000	150,000	20	11,187,500	July 1907	.33½
Silver King Co't'n.†	Utah	6,250,000	1,224,425	5	367,410	Oct. 1907	.15
Shannon, c.	Ariz	3,000,000	300,000	10	450,000	July 1907	.50
Snowstorm, s. l.	Ida	1,500,000	1,500,000	1	450,000	Sept. 1907	.03
Standard Con., g. s.	Cal	2,000,000	178,394	10	5,158,452	Dec. 1907	.10
Stratton'sIndepend	Colo	5,500,000	1,000,007	5	4,895,865	Apr. 1906	.12½
Swansea, g. s. l.	Utah	500,000	100,000	5	329,500	Mar. 1907	.05
Tamarack, c	Mich	1,500,000	60,000	25	9,420,000	July 1907	4.00
Tennessee, c.	Tenn	5,000,000	200,000	25	1,806,250	Feb. 1908	1.25
Tomboy, g. s.	Colo	1,750,000	300,000	5	900,000	June 1906	.48
Tonopah of Nev.	Nevada	1,000,000	1,000,000	1	3,500,000	Oct. 1907	.25
Tonopah Belmont.	Nevada	2,000,000	1,295,007	1	518,003	Apr. 1907	.10
Tonopah Ext'nsion	Nevada	1,000,000	928,433	1	283,030	Apr. 1906	.15
Tonopah Midway	Nevada	1,000,000	1,000,000	1	250,000	Jan. 1907	.05
Uncle Sam, g.s.l.	Utah	500,000	500,000	1	200,000	Dec 1907	.03
United States, com.	Utah	37,500,000	350,933	50	1,271,698	Apr. 1908	.50
United States, pfd.*	Utah	37,500,000	485,845	50	3,606,043	Apr. 1908	.87½
United Cop. com.	Mont	75,000,000	450,000	100	5,962,500	Aug. 1907	1.75
United, c. pf	Mont	5,000,000	50,000	100	1,500,000	May 1907	3.00
United, z. l., pf	Mo.-Kan.	500,000	19,556	25	312,782	Jan. 1908	.50
United Verde, c.	Ariz	3,000,000	300,000	10	19,935,322	Mar. 1908	.75
U.S. Red. & Ref. Pf	Colo	4,000,000	39,458	100	1,360,294	Oct. 1907	1.50
Utah, g.(Fish Sp'gs)	Utah	1,000,000	100,000	10	300,000	Apr. 1908	.03
Utah Con., c.	Utah	1,500,000	300,000	5	7,836,000	Apr. 1908	.50
Victoria, Utah.	Utah	250,000	250,000	1	177,500	Mar. 1907	.04
Vindicator Con., g.	Colo	1,500,000	1,500,000	1	1,830,000	Apr. 1908	.04
Wolverine, c.	Mich	1,500,000	60,000	25	4,800,000	Apr. 1908	5.00
Work, g	Colo	1,500,000	1,500,000	1	165,000	Apr. 1908	.01
YankeeCon	Utah	500,000	500,000	1	157,500	Oct. 1907	.03
Yellow Aster, g.	Cal	1,000,000	100,000	10	958,789	Aug. 1907	.20

*Previous to consolidation $1,436,250 were divided. †Amalgamated.

Coal, Iron and Other Industrials—United States.

Name of Company and Location.		Author. ized Capital.	Shares. Issued.	Par Val. $	Dividends. Total to Date.	Latest. Date.	Amt.
Ala. Con., C. & I., pf.	Ala.	$2,500,000	24,638	100	$905,265	May 1905	$1.75
Allis-Chalmers, pf.	U S	25,000,000	200,000	100	3,213,750	Feb. 1904	1.75
Amer. Ag. Chem., pf.	U. S	20,000,000	181,530	100	9,002,752	Apr. 1908	3.00½
American Cement.	Pa.	2,000,000	200,000	10	1,168,000	Jan. 1908	.30
American Coal.	Md.	1,500,000	50,000	25	2,367,500	Sept. 1907	1.25
Associated Oil.	Cal.	21,000,000	21,000,000	1	630,000	Aug. 1905	.01
Bethlehem Steel, pf.	Pa.	15,000,000	150,000	100	900,000	Nov. 1906	.75
Cambria Steel.	Pa.	50,000,000	900,000	50	9,337,500	Feb. 1908	.75
Caribou Oil.	Cal.	100,000	80,000	1	56,000	July 1905	.07
Central C. & C., com	Mo.	5,125,000	51,250	100	2,229,375	Apr. 1908	1.50
Central C. & C., pf.	Mo.	1,875,000	18,750	100	1,359,378	Apr. 1908	1.25
Central Oil	W. Va.	1,500,000	60,000	25	182,500	May 1904	.25
Claremont Oil.	Cal.	500,000	450,000	1	58,500	June 1905	.01
Col. & Hock. C. & I,pf.	Ohio	7,000,000	69,244	100	383,818	Apr. 1908	1 50
Consolidated Coal	Ill.	5,000,000	50,000	100	350,000	July 1904	1.00
Consolidation Coal	Md.	10,250,000	102,500	100	9,621,650	Jan. 1908	3.50
Crucible Steel, pf	Pa.	25,000,000	250,000	100	2,125,000	June 1907	1.50
Empire S. & I., pf.	N. J	2,500,000	25,000	100	820,533	Jan. 1908	3.00
Fairmont Coal,	W. Va.	12,000,000	120,000	100	2,100,000	Jan. 1908	2.00
Four Oil	Cal.	500,000	300,000	1	105.406	July 1905	.01
General Chem. Com.	U. S.	12,500,000	74,103	100	2,115,640	June 1908	1.00
General Chem., pf.	U. S.	12,500,000	100,000	100	5,140,178	Apr. 1908	1.50
George's C'k Coal	Md.	2,500,000	22,000	100	1,188,000	July 1904	3.00
Imperial Oil	Cal.	1,000,000	100,000	100	880,000	July 1905	.20
International Salt.	Penn.	30,000,000	182,280	100	927,060	Dec. 1906	1.00
Jeff. & Cl'f C. & I., cm	Pa.	1,500,000	15,000	100	330,000	Aug. 1905	5.00
Jeff. & Cl'f. C. & I.,pf.	Pa.	1,500,000	15,000	100	938,000	Feb. 1908	2.50
Kern River Oil.	Cal.	2,000,000	20,000	100	39,500	May 1905	.13
Lehigh Coal & Nav.	Pa.	17,378,500	346,901	50	27,002,297	May 1908	2.00
Maryland Coal,pf.	Md.	2,000,000	18,850	100	1,715,085	June 1908	2.50
Monon R. Coal, pf.	Pa.	10,000,000	100,000	100	3,854,945	Jan. 1908	3.50
National Carbon, pf.	U. S.	4,500,000	45,000	100	2,047,500	May 1905	1.75
National Lead, com.	N. Y.	15,000,000	149,054	100	2,720,237	July 1908	1.25
National Lead, pf.	N. Y.	15,000,000	149,040	100	17,372,608	June 1908	1.75
Nat'l Steel & Wire,pf.	N. Y.	5,000,000	25,778	100	631,561	May 1906	1.75
New Central Coal	Md.	1,000,000	50,000	20	350,000	May 1907	.40
New River Coal, pfd.	W. Va.	4,000,000	37,617	100	225,702	Nov. 1907	1.50
Pacific Coast Borax.	Cal.	2,000,000	19,000	100	2,086,500	Aug. 1905	1.90
Peerless Oil.	Cal.	1,000,000	92,000	10	396,320	May 1905	.14
Penna. Salt.	Pa.	3,000,000	60,000	50	14,918,000	Apr. 1908	3.00
Penna. Steel, pfd.	Pa.	25,000,000	168,214	100	8,204,493	Nov. 1907	3.50
Phila. Gas, com	Pa.	28,953,029	579,061	50	8,484,336	Nov. 1907	.75
Phila. Gas, pf.	Pa.	6,000,000	120,000	50	2,700,000	Mar. 1908	1.25
Pittsburg Coal, pf.	Pa.	32,000,000	297,010	100	11,434,962	Apr. 1908	1.75
Pocahontas Coll., pf.†	W. Va.	2,800,000	28,000	100	84,000	Jan. 1908	3.00
Pocahontas Coll.,cm†	W. Va.	4,520,000	45,200	100	135,600	Oct. 1907	3.00
Republic I. & S., pfd.	Ill.	25,000,000	204,169	100	6,045,338	Apr. 1908	1.75
Sloss-Sheffield, com.	Ala	10,000,000	100,000	100	1,625,000	Mar. 1908	1.25
Sloss-Sheffield, pf.	Ala	10,000,000	67,000	100	3,634,750	July 1908	1.75
Standard Oil.	U. S.	100,000,000	970,000	100	614,002,905	June 1908	9.00
Tenn. C. & I., com	Tenn	22,553,600	225,536	100	3,583,060	Nov. 1907	1.00
Tenn. C. & I., pf.	Tenn	248,000	2,480	100	390,040	Nov. 1907	2.00
Texas & Pacific Coal.	Texas	2,500,000	23,940	100	1,663,830	Dec. 1908	1.50
United Metals Selling	U. S.	5,000,000	50,000	100	5,125,000	Apr. 1908	5.00
U. S. SteelCorp.,cm.,	U. S.	550,000,000	5,083,025	100	73,666,079	June 1908	.50
U. S. Steel Corp., pf.	U. S.	360,281,100	3,603,141	100	206,371,215	May 1908	1.75
Va. Carolina Ch., pf.	U. S.	20,000,000	180,000	100	13,620,569	July 1908	2.00
Warwick I. & S.	U. S.	1,500,000	145,581	1	473,138	Nov. 1907	.30
Westmoreland Coal	Pa.	3,000,000	60,000	50	8,730,000	Apr. 1908	2.50

Canada, Mexico, Central and South America.

Name of Company and Location.		Author-ized Capital.	Shares. Issued.	Par Val. $	Dividends. Total to Date.	Latest. Date.	Amt.
Amistad y Conc'rdia.	Mex	$480,000	9,600	50	$258,064	Jan. 1905	$1.71
Batopilas.	Mex	9,000,000	446,268	20	† 55,784	Dec. 1907	.12½
British Columbia, c.	B. C.	3,000,000	503,000	5	201,200	Sept. 1907	.40
Buffalo, s.	Ont.	1,000,000	900,000	100	189,000	Apr. 1908	.08
Butters' Salvador, g.	Salv	750,000	150,000	5	600,000	Apr. 1905	.25
Coniagas (Cobalt)	Ont.	4,000,000	800,000	5	600.000	May 1908	.10
Consolidated M & S.	B. C.	5,500,000	53,552	100	781,885	Nov. 1907	1.25
Crow's Nest Pass	B. C.	4,000,000	160,000	25	2,018,648	July 1907	.62½
Dominion Coal, com.	N. S.	15,000,000	150,000	100	2,850,000	July 1908	1.00
Dominion Coal, pf.	N. S.	3,000,000	30,000	100	‡630,000	Feb. 1908	3.50
Dos Estrellas. g. s.*	Mex	300,000	300,000	1	6,510,000	Apr. 1908	.50
El Oro, g. s.	Mex	5,750,000	1,080,000	5	4,600,800	Jan. 1908	.36
Esperanza, s. g.	Mex	2,275,000	455,000	5	8,426,150	Apr. 1908	1.09
Foster Cobalt, s.	Ont.	1,000,000	1,000,000	1	50,000	Jan. 1907	.05
Granby Con	B. C.	15,000,000	135,000	100	3,238,630	June 1908	2.00
Greene Con. Copper.	Mex	8,640,000	864,000	10	6,137,800	Mar. 1907	.40
Greene Con. Gold.	Mex	5,000,000	500,000	10	300,000	July 1905	.20
GreenGold-Silv'r,pfd	Mex	3,000,000	300,000	10	120,000	Mar. 1907	.40
Guanajuato	Mex	3,000,000	540,000	5	74,250	Oct. 1906	.07
Guggenheim Expl.	Mex	17,000,000	105,000	100	4,485,000	July 1908	2.50
Hinds Con., g.s.c.l.	Mex	5,000,000	5,000,000	1	100,000	Feb. 1908	.02
Kerr Lake, s.	Ont.	3,000,000	600,000	5	570,000	Apr. 1908	.15
LeRoi No. 2, g.	B. C.	3,000,000	120,000	25	774,000	Mar. 1908	.48
McKinley-Darragh,s.	Ont.	2,500,000	2,000,000	1	180,000	Jan. 1908	.04
Mexican Coal & Coke	Mex.	5,000,000	50,000	100	600.000	Dec. 1905	3.00
Mex. Con. M. & S. Co.	Mex	2,500,000	240,000	10	660,000	Mar. 1908	.25
Mines Co. of Am.	Mex	2,000,000	2,000,000	1	3,145,000	June 1908	.02
N. Y. & Hond. Ros.	C. A.	1,500,000	150,000	10	2,227,000	June 1908	.10
Nipissing, s.	Ont	6,000,000	1,200,000	5	1,680,000	Apr. 1908	.15
North Star.	B. C.	1,500,000	1,300,000	1	351,000	Dec. 1904	1.00
N. S. St. & Coal, com.	N. S.	5,000,000	49,876	100	1,087,856	Apr. 1908	1.50
N. S. St. & Coal, pf.	N. S.	1,030,000	10,300	100	437,750	Apr. 1908	2.00
Penoles*	Mex	250,000	2,500	100	8,630,000	Dec. 1907	20.00
Platanillo.	Mex	500,000	206,989	1	5,580	Sept. 1906	.00
Reco, g. s.l	B. C.	1,000,000	958,000	1	327,082	Apr. 1906	.02
Silver Queen, s.	Ont.	1,500,000	1,500,000	1	195,000	May 1908	.05
Slocan Star.	B. C.	500,000	500,000	1	575,000	Dec. 1904	.05
Tezuitlan Copper	Mex.	1,000,000	10,000	100	.....	July 1908	1.50
Tilt Cove, c.	N. F.	1,000,000	89,000	2	21,360	Jan. 1905	.48
Tretheway, s.	Ont.	1,000,000	1,000,000	1	80,000	Mar. 1907	.04
Tyee, c	B. C.	940,000	180,000	5	136,800	Dec. 1904	.24

*Mexican Currency. †Since reorganization. ‡Since August, 1905.

Industrial

The district office maintained by Allis-Chalmers Company, at San Francisco, in charge of H. D. Scribner, manager, has been removed from the Atlas building to the Phillips building, 599 Mission street.

Wagner Electric Manufacturing Company, St. Louis, Mo., has issued a neat little booklet, entitled "Vox Populi," containing quite a number of testimonials from users of their single-phase motors. A copy can be obtained by addressing the firm direct.

The Sanford-Day Iron Works, Knoxville, Tenn., has gotten out a 5-ft. pocket tape line, which they offer to send free of charge to any mine manager, superintendent or operator who will send his truck specifications, together with the name of the wheel he is at present using.

The Cia Metalurgica de Torreon, at Torreon, Coah, Mexico, recently placed an order for an Allis-Chalmers 14 and 30"x42" horizontal heavy-duty tandem compound Reynolds-Corliss engine, direct coupled to a 300-cu. ft. Connersville special smelter blower. The engine shaft has been extended for the purpose.

The one-mile steel viaduct, extending from the Delaware, Lackawanna and Western Railroad passenger terminal, Hoboken, N. J., to Hoboken Heights, was given two coats of Dixon's silica-graphite paint in the fall of 1899, and it has protected this structure for eight years without the necessity of repainting.

The H. W. Johns-Manville Company announces the opening of a branch office in Indianapolis, Ind., to take care of the local requirements of the trade in that territory. This office, which is located at 30 South Pennsylvania street, Indianapolis, will be under the management of Charles E. Wehr, who, for several years, has represented the company in that section.

The R. D. Nuttall Company, of Pittsburg, announces that they have added to their already comprehensive list of gears and pinions, the well-known Titan brand of manganese-steel gears and pinions, having arranged with the Atha Steel Casting Company for their exclusive sale. This places the Nuttall company in a position to furnish practically everything in the way of gears and pinions for every requirement of traction and electric-railway service.

Some time ago the Wood Drill Works sent a drill to the Panama Canal on trial believing that the government would realize its worth. A few days ago they received an order for twelve 3 5-8 drills, the largest size they make and these have already been shipped. The drills will bore down 24 ft. They also have received an order for 25 more drills and the plant is now at work turning these out. The Wood drills have been used on some of the largest contracting jobs in the world and they have invariably proven their sterling worth.

The C. S. Card Iron Works Company, 1443 Blake street, Denver, Colo., makes a specialty of the manufacturing of coal-handling machinery. The best known of its specialties are its mine cars, with improved roller bearing wheels; other specialties are shaking screens, perforated screen plates, mine cages, sheave wheels, track rollers, curve sheaves, rope swivels, and mine-car hitchings. Some 20 years ago these specialties were known only in the coalfields immediately adjacent to Denver, but their reputation has spread throughout the coalfields of Colorado, New Mexico, Utah and Wyoming.

The Cutler-Hammer Manufacturing Company, of Milwaukee, has just issued a 16-page pamphlet descriptive of their "Wirt Type" dynamo brush, designed for use with low-tension direct-current motors and generators, alternating current generators, plating dynamos, exciters, etc. The construction of the brush is fully described and illustrated in the pamphlet in question, which states that in designing a ynamo brush two conditions must be met in order to insure satisfactory operation. One of these is that the brush must be elastic so that it will make good contact with the commutator under slight pressure, disregard of this condition resulting in undue heating and rapid deterioration of both brush and commutator, due to friction. The second requisite is that the brush must be so designed as to oppose a high resistance to the wasteful and destructive current that is generated when adjoining commutator bars are short-circuited by the brush. In addition to the purely descriptive matter and price list, the pamphlet contains useful information on the care of commutators and brushes, the importance of correct lap, etc.

The Jeffrey Manufacturing Company, of Columbus, Ohio, has issued a supplement, Bulletin No. 24, describing their new drop-rail mine cage. Among the advantageous features which contribute to the uniformly successful performance of this cage, the following may be noted: Its construction is of the simplest and strongest character throughout, minimizing the possibilities of breakdown and cost of maintenance; its operation is positive in every feature; it may be depended upon to work properly and continuously; it prolongs the life of the mine-car equipment, by relieving the wheels and trucks from the strain incident to the outward plunge of the car when dumping; it greatly facilitates the operation of receiving the loaded cars and discharging the empties in the pit; it dumps with a smooth outward swing, unattended by shock or severe strain. The cage is made in two parts, which may be termed the "hoisting" and "dumping" sections respectively. The former travels in guideways and maintains a fixed position, while the latter carries the car and rotates, or tilts, forward when dumping, on a hinge shaft, by which the two sections are connected.

The Crane Company, Chicago, has devised and is making a new pipe-cutting machine, placed on the market to meet the demand for a low-priced machine, operated by hand or power, for high-class service. All parts have been designed to withstand any strains that a pipe cutting and threading machine may be subjected to. Simplicity of operation, adjustment and arrangement has been carried out to the minutest detail. This tool possesses many features which increase output and ease of operation. The gripping, threading, cutting-off and adjustment have been so arranged that no unnecessary operations are required. The frame is one casting, having bed and stand in one piece, eliminating the use of light legs and giving greatest rigidity with minimum weight and floor space. The die-head is bolted to a movable carriage, with ample travel. Upon the die-head are the dies, pipe guides and cutting-off tool. The dies are of the improved adjustable type, made collapsible, and are similar to those supplied in Crane hand die stocks. The dies are carried in suitable frames, sliding in guides. These frames are moved by a screw operated by a hand wheel. The dies are set to gauge by a simple locking device, which allows any number of pieces of pipe of the same size to be threaded without any further adjustment. These dies have four cutting edges and will give good service on either steel or wrought-iron pipe. Dies are made interchangeable and one die of a set may be replaced if broken, thus reducing the repair bill to the minimum. Dies, when not in use on machine, may be used in a hand stock. Change in size of dies may be made in a few seconds. When cutting off, the pipe is guided by two steel guides, hardened on the face. These guides are operated by a right and left screw and hand wheel. The cutting-off tool is operated by a lever and rack. This makes a rapid, simple and positive device, and extremely powerful. The gripping chuck is of the quick-gripping type, rapid in action and powerful. Pipe may be released and gripped by the throwing of a lever without stopping the machine. The chuck is adjustable to the different sizes of pipe within range of the machine, without moving or altering the jaws. The jaws are of tool steel carried in steel holders and are removable for grinding or replacing. The rear end of the spindle contains a universal centering chuck, compact in design and readily adjusted to the various sizes of pipe. Oil is supplied by a small tank supported on a swivel joint above the die head. A second small tank is placed in the frame, and to this the oil from the dies returns, the supply being controlled by a pet-cock. One pulley is necessary to drive. Three changes of speed are obtained by gears which are shifted by a lever placed on the frame. This device is positive, simple and cannot get out of order. All machines are supplied with necessary crank for hand operation. Bolt dies ¼ to 1½ in. can be furnished if desired. All necessary pipe gauge blanks, wrenches, etc., are supplied with the machine. The general dimensions are: Countershaft pulley, 9¾ in. diameter x 3½ in. face; countershaft speed, 200 r.p.h.; floor space, 44x23 in.; weight, 700 lb.

Trade Catalogs

Heisler Locomotive Works, Erie, Penn. Catalog. Locomotives. Pp. 36, illustrated, paper, 6x9 in.

H. K. Porter Company, Pittsburgh, Penn. Catalog. Light Locomotives. Pp. 224, illustrated, cloth, 6x9 in.

Youngstown Car Manufacturing Company, Youngstown, Ohio. Catalog. Industrial Cars. Illustrated, paper, 6x9 in.

The Thew Automatic Shovel Company, Lorain, Ohio. Catalog. Steam Shovels. Pp. 36, illustrated, paper, 6x9 in.

The C. T. Carnahan Manufacturing Company, Denver, Colo. Catalog. Murphy Drill. Pp. 42, illustrated, paper, 7x10 in.

The Trenton Iron Company, Trenton, N. J. Catalog and price list. Wire Rope and Fittings. Pp. 50, illustrated, paper, 4x7 in.

The Thompson Balance Company, Denver, Colo. Catalog. Precision Balances and Weights. Pp. 32, illustrated, paper, 6x9 in.

The Star Drilling Machine Company, Akron, Ohio. Catalog. Portable Drilling Machines. Pp. 104, illustrated, paper, 6½x9½ in.

Sturtevant Mill Company, Boston, Mass. Catalog No. 60. Crushing and Grinding Machinery. Pp. 44, illustrated, paper, 8x10 in.

American Steam Pump Company, Battle Creek, Mich. Catalog. Marsh Pumping Machinery. Pp. 136, illustrated, paper, 6½x7½ in.

American Injector Company, Detroit, Mich. Catalog. Injectors, Ejectors, Oil Pumps, Oil Cups, etc. Pp. 52, illustrated, paper, 6x9 in.

The Vulcan Iron Works Company, Toledo, Ohio. Catalog. Steam and Electric Power Shovels. Pp. 120, illustrated, leather, 6x9 in.

Rife Hydraulic Engine Manufacturing Company, 111 Broadway, New York. Catalog Rife Hydraulic Ram. Pp. 32, illustrated, paper, 6x9 in.

Oneida Steel Pulley Company, Oneida, N. Y. Catalog. Steel Pulleys, Wood Split Pulleys, Couplings, etc. Pp. 122, illustrated, paper, 6x9 in.

Lobdell Car Wheel Company, Wilmington, Del. Catalog. Self-oiling Wheels for Mine Railways, etc. Pp. 24, illustrated, paper, 6x9 in.

The Buff and Buff Manufacturing Company, Boston, Mass. Catalog. Engineering and Mining Instruments. Pp. 118, illustrated, paper, 6x9 in.

F. L. Smidth and Company, 41 Cortlandt street, New York. Booklet. The Use of the Kominuter for Grinding Ores. Pp. 20, illustrated, paper, 4½x6 in.